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Issue #66 May 1992

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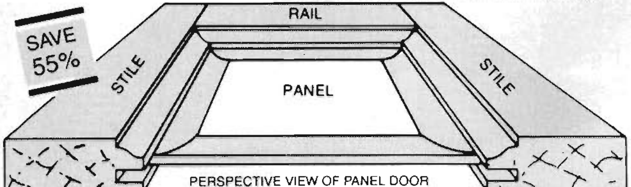
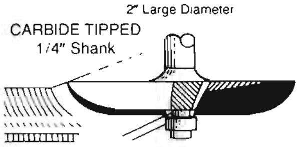


PERSPECTIVE VIEW OF PANEL DOOR
(WITH ONE RAIL REMOVED)

RAISED PANEL BIT
SUPPLIED WITH
BALL BEARING



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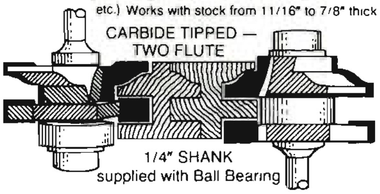

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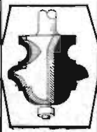
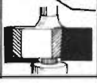
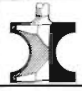
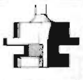
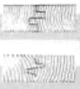
#603	**Solid Carbide**	1/4" Spiral Cutter		1/4"	3/4"	1/4"	$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2" *	$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2" *	$24.00
#905		1/2" Spiral Cutter	*Proper Adaptor Will Be Supplied	1/2"	1 1/2"	1/2"	$29.00
#530		3/16" **Edge Beading**	3/16" Dia. of Circle		1/2"	1/4"	$15.00
#531		5/16" Edge Beading	5/16" Dia. of Circle		1/2"	1/4"	$15.50
#350		1/8" **Round Over**	1/8" R	3/4"	3/8"	1/4"	$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	$12.00
#353		5/16" Round Over	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#209		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	$15.00
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#655		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/2"	$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	$21.00
#199		**Multiform Moulding**	Unlimited Patterns	2 1/4"	2"	1/2"	$40.00
#205		1/4" **Cove**	1/4" R	1"	1/2"	1/4"	$12.00
#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	$14.00
#643		1/2" Cove	1/2" R	1 1/2"	5/8"	1/2"	$15.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	$26.00
#231		5/32" **Roman Ogee**	5/32" R	1 1/4"	15/32"	1/4"	$16.00
#232		1/4" Roman Ogee	1/4" R	1 1/2"	3/4"	1/4"	$17.00
#506		1/2" **Pattern**	Flush Trim	1/2"	1"	1/4"	$15.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	$17.00
#366		1/8" **Slot Cutter**	3/8" Deep	1 1/4"	1/8"	1/4"	$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	$13.00
#670		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/2"	$14.00
#211		3/8" **Core Box**	round nose	3/8"	3/8"	1/4"	$10.00
#212		1/2" Core Box	round nose	1/2"	11/32"	1/4"	$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	$17.00
#548		**Lockmitre**		2"	7/8"	1/4"	$32.00
#214		1/4" **Straight**	plunge cutting	1/4"	3/4"	1/4"	$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	$ 9.50
#779		3/4" Straight	plunge cutting	3/4"	1 1/2"	1/2"	$10.00
#462		1/2" **Bull Nose**	1/2" Dia. of Circle		3/4"	1/4"	$16.00
#464		3/4" Bull Nose	3/4" Dia. of Circle		1"	1/4"	$21.00
#764		3/4" Bull Nose	3/4" Dia. of Circle		1"	1/2"	$21.00
#545		**Tongue & Groove**	Straight 	1 5/8"	1"	1/4"	$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	$29.00
#450		1/8" **Beading**	1/8" R	3/4"	3/8"	1/4"	$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	$13.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#500		3/8" **Flush**	**Trimming**	3/8"	1/2"	1/4"	$ 7.00
#501		3/8" Flush	**Trimming**	3/8"	1"	1/4"	$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	$ 8.50
#221		1/2" Flush	Trimming	1/2"	1 3/16"	1/2"	$ 8.00
#558		**Thumbnail**		1 3/16"	3/8"	1/4"	$18.50
#858		Thumbnail		2 1/2"	3/4"	1/2"	$35.00
#579		**Molding Plane**		1 1/8"	1 3/4"	1/4"	$31.95
#879		Molding Plane		1 1/8"	1 3/4"	1/2"	$31.95

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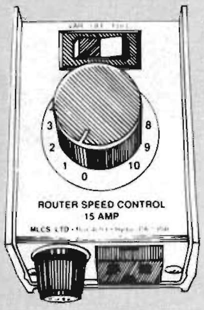

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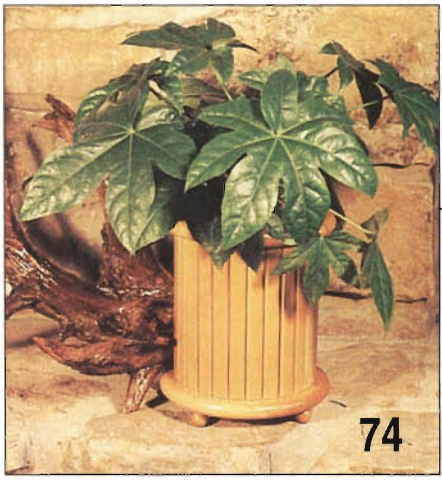

On the Cover

Robert Greenburg demonstrates the initial saw cuts that define the spirals on the legs of the reproduction harpsichord stand he built for a client. In his San Francisco business, he regularly builds and repairs harpsichords; he made six of these spiral legs for a stand he designed, based on a piece in a museum. Making the legs involves both turning and carving, and the layout and carving process is interesting to observe. Turn to page 27, and see for yourself.

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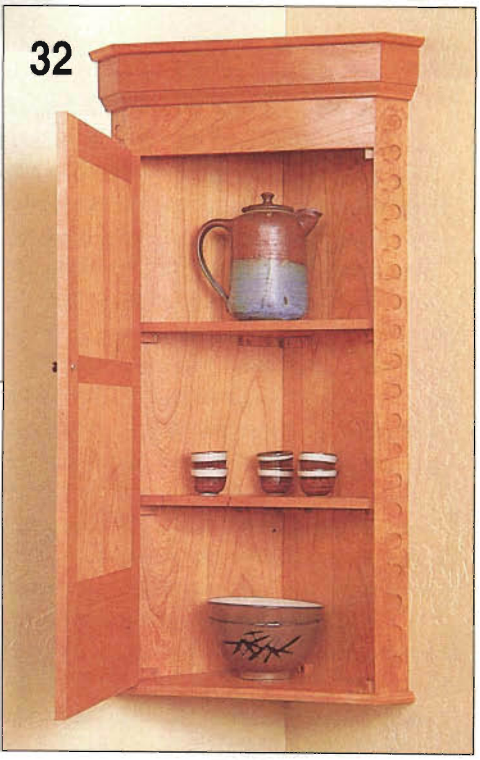

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Clear Cuts

Now that our little brother publication *Weekend Woodcrafts* is well under way, (see page 83 if you haven't started your subscription yet), we *feel* like we have a little more room in *PW* to teach you some techniques that involve materials other than wood—techniques and materials that can enhance your woodworking projects. For instance, in this issue, we devote six pages to the art of working with curved glass. Furnituremaker Rod Beemer explains everything from cutting and handling to designing projects that incorporate curved glass panels. And he lists sources for custom curved glass manufacturers. I'm sure you'll want to try your hand at this once you see the "Curved Glass Wall Sconce" project that incorporates these techniques. Rod has promised us a large furniture project with curved glass for a future issue, and we plan to hold him to it!

We also have a little metalworking project for you this time: a fixture for brazing band saw blades. It's made of aluminum—easily worked with carbide woodworking tools—and once you make it, you'll be able to repair broken blades, and make your own from bulk blade stock.

That brazing fixture is just one of several Projects for the Shop featured in this issue. Since it's spring, it's a good idea to clean up, get organized, sharpen things, and get ready for those great, late summer evenings in the shop. There are some terrific projects ahead, and you're going to want to be ready. To that end we have a flexible, practical design for a lumber rack, a very handy lathe tool carousel, and—for safety's sake—some jointer push blocks that will allow you to do some tricky maneuvers without risking any fingers. And don't forget "Scrap Solutions;" this time, readers help you clean out your plywood shorts bin.

If you're already set to start cutting wood, take a look at the outdoor furniture projects on page 36. If you can repeatedly drill holes in the same location, you can make these three patio pieces. Or make some tambour planters, belt buckles, a corner cabinet, or the full–scale model jack plane (my favorite project of the bunch). This piece *will* elicit "oohs" and "aahs" whether it sits on a shelf in your shop, or a shelf in your office.

As I look back at this issue it strikes me that it differs from most in that there are more projects for *you* this time. Usually most of our projects are things you might make for other people. There are some of those, but there's room here for you to indulge yourself a little, too.

David M. Camp

Be Safe!

Occasionally we show a setup or a technique that may appear to be unsafe. These procedures are demonstrated by experienced craftsmen who are comfortable using the setups they show.

It is up to you to determine whether or not you can safely perform these operations on your own equipment. There is always another way, and you should choose the method that seems safest to you.

Letters

We welcome your comments, pro or con, about articles we publish. Send your letters to: Editor, *Popular Woodworking*, 1320 Galaxy Way, Concord, CA 94520. Letters may be edited for publication.

Instant Mandrel

When turning candlesticks, "Bud Vases" (*PW* #64), toothpick holders, etc.,I find it easiest to drill the hole in the square stock before turning. Instead of using a wooden mandrel as your article suggests, I use a drum sander in the headstock drill chuck to support the drilled end of the turning. It works for me!

Don Grodell, Newbury Park, CA

Jeremiah's Ultimate Lathe

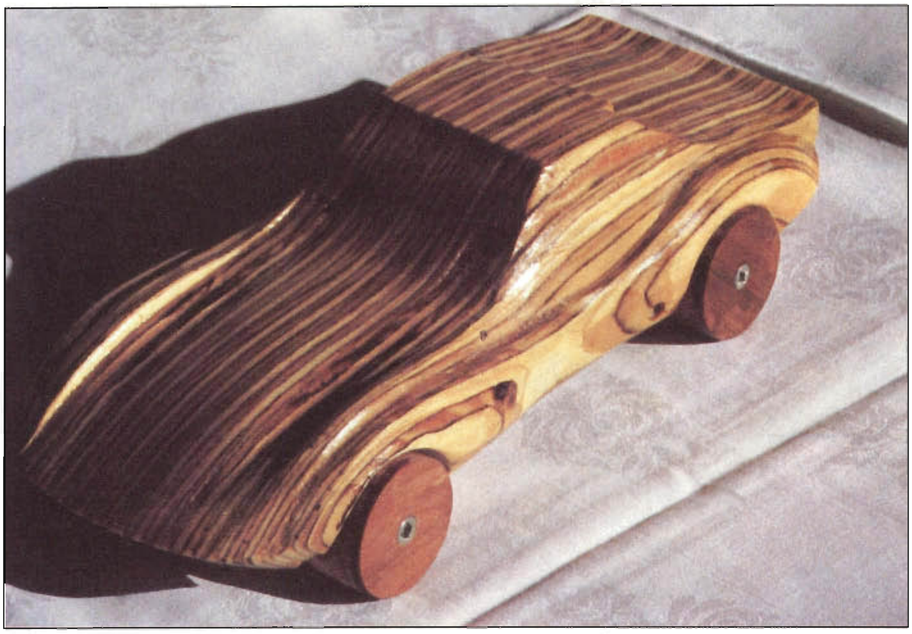
Thank you for the article on "Don's Ultimate Lathe" in Issue #64. I made some substitutions of materials that make it easier to build a lathe of this type. First, the transmission he chose is rare. Luckily, the world is full of similar ones made by the Foote Corp. It has a similar case, comes in 3, 4 and 5 speeds, are found in Sears, Murray's and other common lawn tractors. Input and output shafts are offset 90° and are ⅝" keyed shafts the correct length for Chicago V–belt pulleys.

Second, I made the faceplate shaft ¾" X 18" threaded ¾" pipe, threaded for ¾" with 16 threads per inch at both ends, driven pulley in the center. This size round stock, pillow block bearings and pulley are common sizes found in hardware stores and mail order houses. Using ¾" 16 tpi. allows the use of easily found, stock faceplates and chucks found at Sears, AMT and other supply houses.

Third, by adding a reversing switch to the motor, it not only allows the reverse gear of the transmission to be used, but gives you more flexibility in turning or sanding from either end or side of the faceplate shaft.

I picked up some oak railroad ties for building the base. The whole project, including the 2hp motor and reversing switch, has cost less than $300.

Jeremiah O. Coughlin, McHenry, IL



Plywood Corvette

Enclosed are some photos of the model Corvette car I made from the PullOut™ Plans in the January 1992 Issue (#64). I enjoyed the project very much. I elected to make the model from plywood to get the effects of "graining" when I tapered through the laminations.

I did little or no "carving"; instead, I pre–sanded each layer to size and had only to do finish sanding. This saved a lot of hand carving. I finished it with clear polyurethane. My friends admire the model very much.

John F. Adams, Jacksonville, FL

Half A Board Inch?

I am a new subscriber to your magazine, and I will say it fits in with my needs now. I retired last year after 42 years in the carpentry trade. I also taught in our union apprentice program, so I appreciated the article about the Essex table on the framing square (*PW* #65, March 1992).

Readers might like to know another thing about the scale. The numbers under the 12 and across the top (2" to 24") can be used to represent either width in inches, or length in feet. If you use the numbers under the 12 as width, use the numbers across the top for length. Try it; it works.

In my class, I would spend the first four–hour session on what I called "the junk scales"—not that they were junk, it's just that they are seldom used now. In addition to the Essex table, I have used the octagon scale four or five times, the hundredths scale a few times, and the brace table never. [Editor's note: All of the tables and uses of the steel square are covered thoroughly in a recent reprint of the 1883 classic, *The Steel Square*, by H. H. Siegele (Sterling Publishing, 387 Park Ave, South, NY 10016).]

Sometimes, when time allowed, I would show how to calculate wages, cubic yards and lay out a parabola, naturally explaining that these were things you don't keep in your memory; you keep your books and papers to remember how to do them.

In the piece, you neglected to keep in mind that the board foot is a measure of lumber before dressing. When this scale was made up, all lumber for framing was rough—full 2" X full 4". Fractions aren't even considered in listing the thickness or width when figuring board footage. Therefore, you wouldn't figure an 8' X 14" X1½" board at 14 bf. Your lumber dealer would call it 8' X 14" X 2 and come up with 18⁸⁄₁₂ bf. This would be noticed only by a few old farts like me who actually used the scale.

I work in my shop now, making the things that interest me like the exploding coin bank in the same issue. I had some troubles with the screws taking the force of the mouse trap; after a few explosions left me with loose and missing screws, I changed them to 1" round head stove bolts with the nut on the inside, tightened down tight.

Clarence VanMatre, Muncie, IN

Where's Sears?

I hope you take this comment as constructive criticism, because in general, your magazine is one of the best in its field. But can you explain why Sears' Craftsman portable jigsaws were not evaluated by your "team of craftsmen" ("Tool Talk: Portable Jigsaws," *PW* #65)? Most of us out here, I would bet, can only look at, and dream about the $250–and–up tools shown. They're far out of our price range.

Instead, we make do with Craftsman tools. For the money, they are okay. But when publications like yours don't try them, criticize them, and suggest improvements, Sears has no incentive to improve.

Alfred B. Clem, Sedona, AZ

Here's the situation: Sears doesn't like to talk about it, but the Craftsman brand is actually just a label put on tools made by any number of manufacturers—tool makers who make the same poduct under their own name—often in direct competition with the Craftsman version. In the case of the Sears model 27251 jigsaw, it is the same tool as the Black & Decker model 3157, which was reviewed in our article. As a courtesy to Sears, we opted to cut the review of their jigsaw, rather than dispell the Craftsman myth. We won't do that again. You have reminded us of how important this information is to the consumer, so we will be sure to include it in the future.

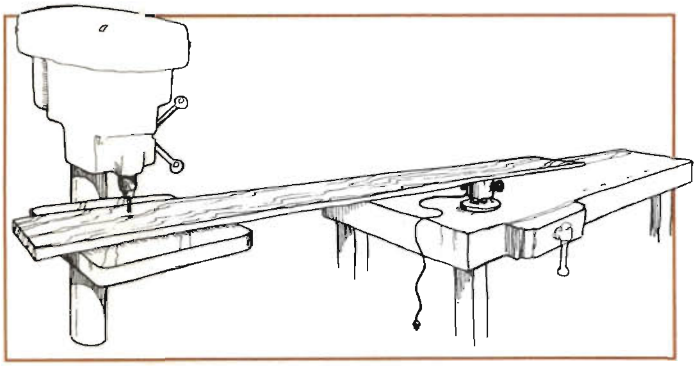
Editor

Tricks of the Trade

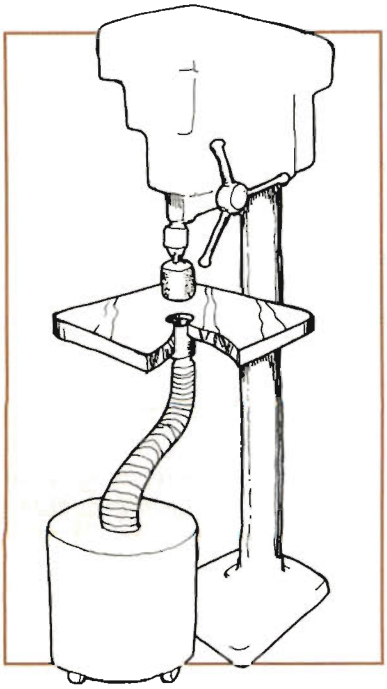
Tricks of the Trade shares readers' tips for making woodworking tasks easier and safer. Send yours to Tricks of the Trade, c/o Popular Woodworking, 1320 Galaxy Way, Concord, CA 94520. We pay $25 for each trick we publish.

Supporting Long Pieces On The Drill Press

Here's an easy alternative to supporting long pieces of material by hand while trying to position and drill them on your bench top drill press. An ordinary router will provide quick, accurate and stable support. Simply place the router on the workbench and adjust to the height of the drill press table so it supports the far end of the workpiece. The stable base and flat top make it ideal for sliding and positioning material over it, and because routers are designed to be height–adjustable, you can quickly re-set it. Of course, this is only a temporary solution and should not be used where safety requires the workpiece to be held fast. It works best when you're using light, smooth materials.



James R. Kucera
Phoenix, Arizona



Drum Sanding Dust Collection

Drum Sanding piles up a lot of sawdust—here's a way to collect it. Use masking or adhesive tape to shim a pipe so it fits in the hole in the drill press table immediately beneath the drill. Connect the vacuum cleaner hose to the pipe and turn it on while sanding. The same idea can be adapted to fit other tools such as grinders.

Heather Dull
Huntertown, Indiana

Another Method Of Transferring Patterns

Fabric shops sell a toothed wheel for transferring paper patterns to cloth. These toothed wheels are also very handy for transferring patterns to wood. Tape the pattern down to prevent slippage and roll the wheel along the lines. Then wipe powdered chalk or talcum powder over the pattern—it passes through the tiny holes to mark the wood. Since there are often patterns on both sides of a sheet, you can make permanent plywood, hardboard or heavy cardboard patterns for future use, without cutting up the originals.

Don Kinnaman
Phoenix, Arizona

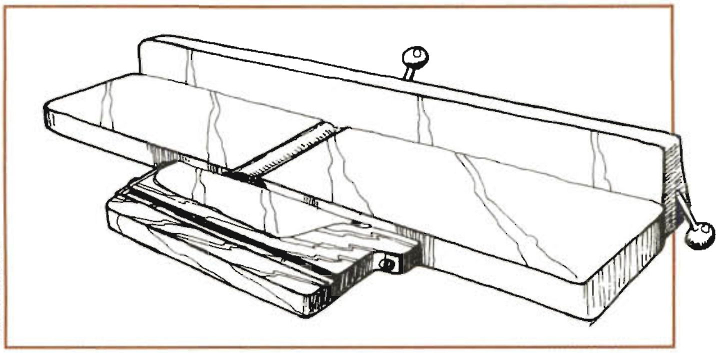
Spindle Turning Trimmings

Everyone knows you can save a lot of time turning square stock by first trimming off the corners on the table saw, but what to do with the trimmings? Save the triangular strips for future use as glue blocks.

Don Kinnaman
Phoenix, Arizona

Rabbeting With A Miter Gauge On The Jointer

After some experimentation, I added a 2" thick piece of maple to the rabbetting shelf on the jointer—with a groove to accommodate my table saw miter gauge. Using the jointer fence for a stop, I can cut end rabbets up to 2" wide with no problem. I added an auxiliary fence to the miter gauge to help prevent splintering. The jointer's cutter head should be adjusted so that lengthwise as well as crosscut rabbets can be cut. You will need to remove the guard during this operation since it will get in the way of the cut.



Graham Blackburn

Don Kinnaman
Phoenix, Arizona

Bottle Holes

Many bottles have interesting shapes and make excellent table lamps. To feed the wire in through the bottom, you must drill a hole through the glass. Fill the bottle with water and cork it tightly so there are no bubbles inside. If you don't have a drill bit specifically made for glass, use a Carboloy cement drill. Be sure to wear goggles and gloves for protection. The water dissipates the heat made by the bit as it slowly drills into the glass, and it will go right through without cracking the glass.

Don Kinnaman
Phoenix, Arizona

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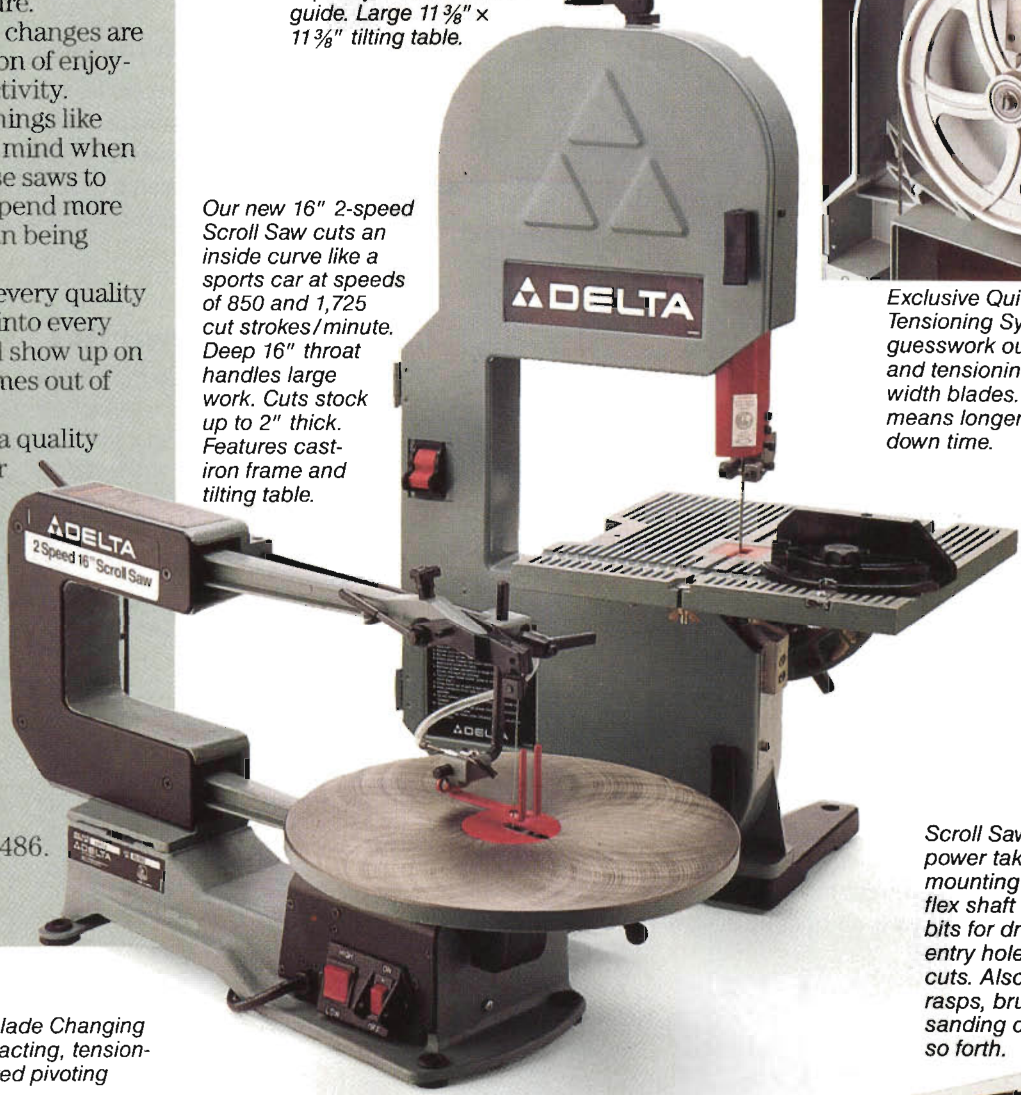

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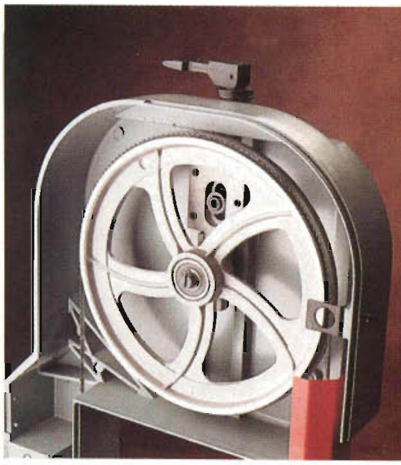

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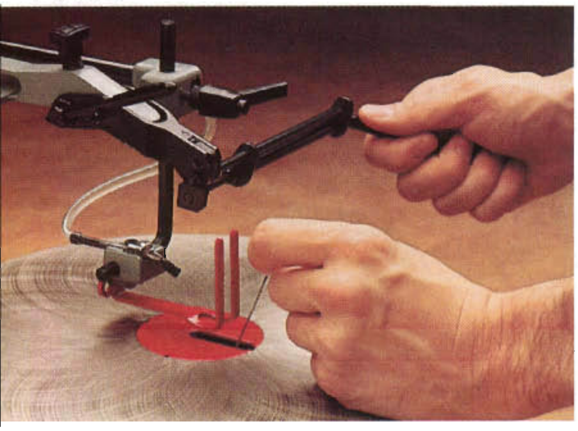

Building On Tradition

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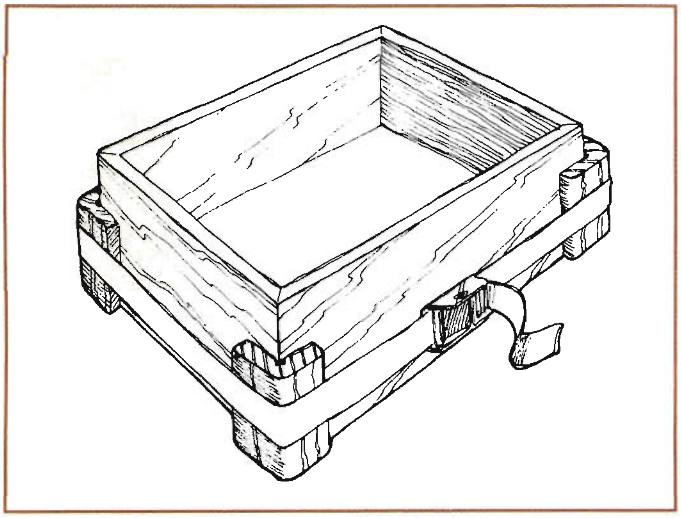
Box Clamping Blocks

A few years ago, while building boxes to sell at craft fairs, I needed a way of clamping all four sides together quickly. I made these corner blocks that together with a single band clamp will hold box sides squarely and securely. I used maple scraps about 1¾" X 1¾" and from 3" to 5" in length to accommodate the boxes I construct. After cutting a ⅞" X ⅞" rabbet in the stock, I cut a ¼" X ¼" groove into the corner of the rabbet to provide room for any excess glue that might squeeze out. My boxes utilize spline–mitered joints, but the same type of blocks with some modification can be used with other corner joints, such as box or rabbet/dado joints.



Eric Schramm
Los Gatos, California

Non–Slip Holding Pad

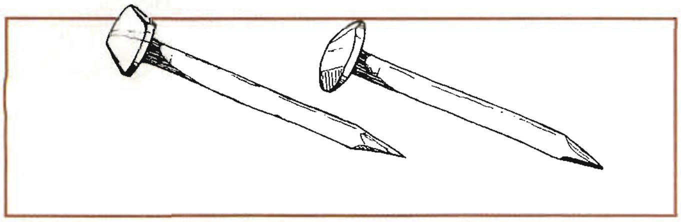
The foam pads used for holding wood while routing or sanding are very handy, but the price isn't, and the size is rather small. I've found an inexpensive substitute—high density, ½" carpet pad. It's the same material. You can buy it from any carpet store for less than $3.00 per square yard, and many places will give you scraps for free.

Ken Erickson
St. Helens, Oregon

False Nails

For the look of old–fashioned cut nails, grind two flats parallel to each other on the round head of modern nails. When driven in, they look like the real McCoy.

Don Kinnaman
Phoenix, Arizona



Loose Screw Tightener

Here's a fast and easy way to secure a loosened wood screw. Simply remove the screw and insert a short piece of solid wire solder in the hole. Then replace the screw and the solder will fill the hole and make a tight grip on the screw threads. This method is a lot quicker than making a wooden plug.

Howard E. Moody
Upper Jay, New York

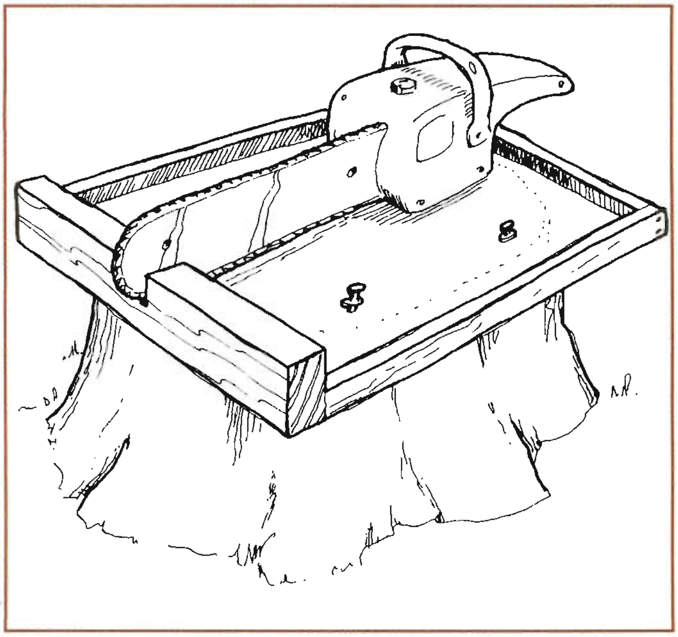
Sanding Scroll–Sawn Curves

Sanding inside curves on scroll–sawn work can be a problem. I use adhesive–backed sandpaper wrapped around the shank of a long drill bit or rod and chucked in a drill or mounted on a lathe. Wrap the sandpaper in the same direction as the drill rotates. As the paper wears, simply peel off the used portion.

Stephen M. Blaisdell
Naugatuck, Connecticut

Chain Saw Maintenance Tray

Save your workbench top from nicks, gouges and oil smears that are a part of chain saw maintenance with this handy work tray. Start with a piece of 18" X 24" X ½" plywood. To one short side nail and glue a 2 X 4 on edge, first cutting a slot in it to hold your chain saw blade. Use 1 X 1 or whatever is handy in your scrap box for the other edges—this way tools and small parts are less likely to get lost.



Graham Blackburn

Take the tray with you for any on–site work you may have with your saw. It will help hold it steady should you need to touch up the chain with a file. You can drill holes as shown here, take some duplex nails with you, and tack the tray to the stump of a tree to keep it steady.

George W. Earley
Mount Hood, Oregon

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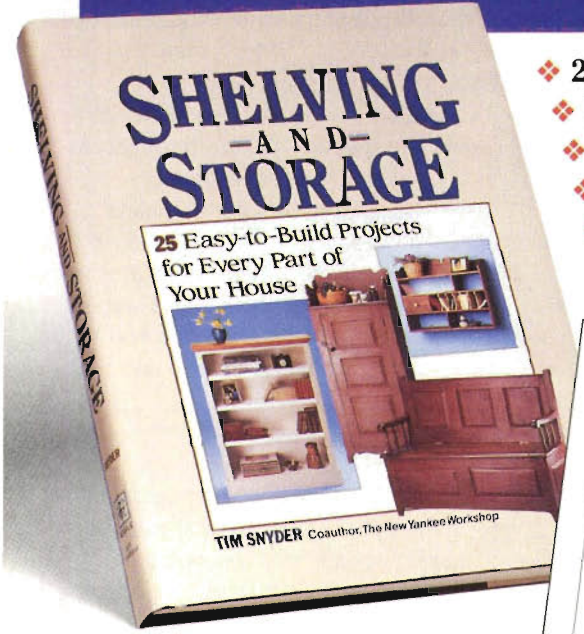
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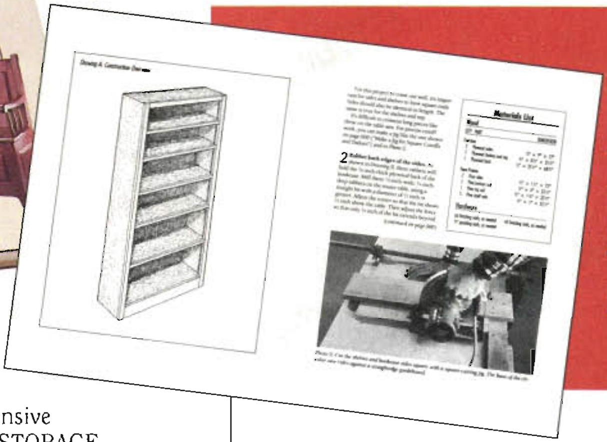

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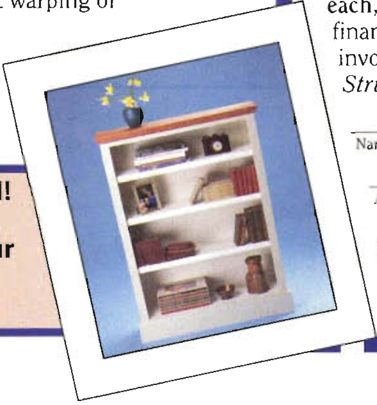

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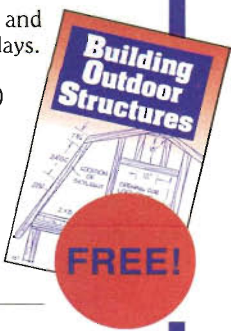

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The Finishing Forum

by Tom Wisshack and George Frank

The Finishing Forum is an ongoing discussion about the art of wood finishing. If you have a question or a problem to solve, we'd like to help. If you have a tip or secret to share, or you recently tried a new product, write to: The Finishing Forum c/o *Popular Woodworking*, 1320 Galaxy Way, Concord, CA 94520. Letters may be edited for publication.

French Polishing 101

I am retired and have plenty of time on my hands. I have always wanted to do some "French polishing" of furniture. Can you tell me a little about the practice?

James McIntire, Boynton Beach, FL

It is good that you have plenty of time on your hands as French polishing is a long and tedious process, but certainly worth the effort.

The basic process is to work pumice and wood grains into the pores of the wood. First you must make a ***tampon*** *(the term used by French finishers) to fit your hand. This tampon's heart is wool. Scraps from old wool socks or sweaters are well suited for this purpose. Wrap the wool in a porous fabric (linen is best) which covers the wool snugly, leaving it a little exposed at the top. Into this opening you feed the wool with a few drops of alcohol, and sprinkle some finely ground pumice stone on the surface to be polished.*

With a broad circling motion, start polishing, forcing the pumice into the pores. The pumice will first fill up the minute spaces of the linen in the tampon, flattening the surface of the pad and making it abrasive. As you polish, the pumice will cut off minute particles of the wood and fill the pores under the pressured rubbing with the tampon. Since these tiny particles are from the surface you are polishing they match the color to perfection and disappear into the pores. Constant and repeated rubbing with the tampon and pumice will smooth the wood to an unequaled degree.

This system is used by the genuine "French Polishers." I do not know the limits of your patience, but if you are not willing to spend as much time on your projects as you indicated, you may want to use fillers. The most commonly used ones are powdered chalk (or colored, if you can find the color to match your wood). You can also use simple whiting powder as the filling agent. You can get dry colors to mix with the white. The binder is rosin, also powdered, and the carrier is mineral spirits. It is common to tint this mixture with asphaltum paint for darker woods. Another option is to use talcum powder, colored with the proper dry colors and mixed with a carrier and binder of shellac and alcohol. I find that this type of filling and polishing requires much skill and experience, although once mastered, it can be faster than the traditional method described above.

George Frank

Ebonizing

I would like to have information on how woods are stained or "ebonized" to a black finish without using paint.

Thomas Winslow, Coloma, MI

To obtain the "ebony black" on wood, I suggest my best recipe calling for a pre-stain, or ***mordant*** *made of extract of "campeche wood" or logwood. The only difficulty is in obtaining the extract of logwood. A refined version of this, called Hematoxylin, is available from druggists, but is costly. However, one needs hardly more than 10 to 15 grams per liter of water; real logwood—if you can get it— takes 50 grams dissolved in a liter of warm water.*

Another choice is to go to a good wood finishing supply dealer and get black aniline dye. This is simple to use, and should prove satisfactory.

George Frank

Picture Perfect

I've been working on a project which involves gluing photographs on blanks of medium density overlay (MDO) that have a chamfered and painted edge. The chamfer gives the photograph a colored border. For a finish, I need something hard, clear and glossy, as well as quick-drying. Exposure to sunlight will not be a problem. I've been using a spray polyurethane, but I'm interested in trying other types of finishes.

I want to start with a brushed polyurethane. Do you suggest thinning? How do I avoid brush marks? And, is there a way to reduce the drying time?

Can you please suggest some other alternative finishes, and any tips concerning their use for this application?

Aaron Armstrong, Platina, CA

The only quick-drying finish that will give you any surface build-up is lacquer, and I wouldn't recommend using it on your photographs. It's highly volatile and could

Micro-Mesh

For years I've been bombarded with the latest in wood working jigs, time-saving devices and finishing products. It's safe to say that I've become a sceptic when it comes to new products. But, every now and then, something sensational sneaks in and I get really excited.

Micro-mesh is manufactured by Micro-Surface Finishing Products, Inc. of Wilton, Iowa. When I contacted the company, a rep told me that the product was originally developed to take the scratches out of Plexiglass aircraft windows and windshields. Apparently it's possible to abrate small pits and scratches without destroying the optical properties. Naturally, my thoughts turned to possible woodworking uses.

I ordered their Professional Woodworkers Kit. It contains nine 3" X 6" abrasive sheets ranging in grit from 1500 to 12,000, a foam sanding block and instructional literature. You are probably wondering why anyone would ever need 12,000-grit paper in their shop—after all, 220 works just fine. At first glance this would seem to have very limited applications for most woodworkers. Instead, this product

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Tom Wisshack *makes and restores fine furniture in Galesburg, Illinois.*
George Frank *is the author of* Adventures In Wood Finishing *(Taunton Press).*

cause the colors to bleed. Polyurethane seems a good choice, although you'll have to put up with its relatively long drying time of about 3 to 4 hours to set, and overnight to cure. I wouldn't suggest thinning—adding more solvent could cause it to react with the pigments in the photographs. I also believe you'll want to build up a substantial coating with as few applications as possible.

You might try "misting" a coat of spray shellac onto the photo before applying a polyurethane coat. This would seal the surface and allow you to get by with fewer coats of the polyurethane. This procedure would also prevent bleeding if you want to experiment with thinning the varnish.

To prevent dust from settling on the surface while the polyurethane sets up, wet your work area down with water, and leave the room after you're finished. If you don't have a separate finishing room, you may need to contain the work in a smaller area with a plywood or cardboard cover. You can also experiment with small amounts of Japan drier added to the polyurethane to speed up the drying process. But remember that this, and the adding of thinners or reducers, may not be totally compatible with the varnish. You'll have to experiment.

Strain your varnish through fine cheesecloth to eliminate any foreign particles that may be contaminating your work. To do away with brush marks, go to an art supply store and buy a very soft bristle brush of the correct width. I have used a camel's hair water color brush with good results. You might also try a foam applicator. The real secret, in either case, is in applying varnish to the surface and then leveling it out using deft brush strokes as light as a feather.

An alternative might be Behlen's Rockhard Tabletop Varnish, which is available from Garret Wade, 161 Avenue of the Americas, New York, NY 10013. I suggest this because it has the lightest amber tone of any varnish and because the company makes superb products for both new and reproduction work. The product has its own reducer which must be used with it.

Speaking of amber, polyurethanes vary in this regard, and you should try various brands to find the best one for you. It will tint your photographs somewhat—the

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actually changed my thinking about the whole sanding process.

When the kit arrived I was working on a new line of inlaid wood jewelry. I use a number of exotic and native hardwoods to create a pattern that is visually exciting, but somehow the pieces were looking like wood blocks with interesting designs. I experimented with the Micro–Mesh and actually polished the surface of the pieces until they had a jewel–like sheen.

Normally, I finish with 600 wet/dry, then apply the finish I've chosen. Micro–Mesh picks up where the 600 leaves off. I started with their 3600–grit abrasive and worked up to the 12,000. The results I got make me reluctant to compare it with ordinary sandpaper. It is graded differently. It has what is described as a uniform scratch pattern and is made with a cushioned back. Both these features contribute to the superior results you get.

The Micro–Mesh Professional Woodworkers Kit includes 1500 to 12,000–grit abrasives and foam sanding block.

Micro–Mesh abasives achieve a sheen and depth of surface on my bolo ties even before I apply the finish.

Don't get me wrong, I'm not suggesting you throw away all your sand paper and stock up on Micro–Mesh—view it as a supplement to aluminum oxide or wet/dry. It's a way of carrying the process a little further.

I discovered something about Micro–Mesh that will be useful to anyone who does touch–up work on furniture. I've often had to make repairs to black lacquered pieces and not been happy with the results. The steel wool and rubbing compound just didn't quite give me the match I was looking for. I found that with the finer grades of Micro–Mesh, you can match the surrounding degree of sheen and make a flawless repair. It saves having to rub the whole surface down.

The company also make a line of abrasives for use on metal and a liquid product called Micro–Gloss. I got a small bottle and tried it on a little rosewood tea caddy I was restoring for a client. After cleaning off the dirt, I rubbed down the surface with a small amount of the liquid on a soft cloth, let it dry to a haze, and buffed it off with a fresh cloth. The original finish was revived to a state of perfection—no visible scratches or marks what–so–ever.

From a practical standpoint, I'd say that you can polish wood way beyond the quality you'd get with automotive abrasives, with shine and depth of surface before applying any finish.

For more information write Micro–Surface Finishing Products, Inc, P.O. Box 818, Wilton, IA 52778. Or call (800) 225-3006. The Professional Woodworkers Kit costs $33.50—that's a lot of money for sandpaper...but this isn't ordinary sandpaper.

Tom Wisshack

cheaper brands may yellow over time.

Having said all this, I should mention that I've had absolutely no experience in varnishing over photographs; I am only speaking from a standpoint of common sense. If you follow my directions, however, and begin experimenting with available products, you may find yourself really enjoying the process and achieving the superior results you are after.

Tom Wisshack

Outstanding Curls

I do a lot of my furniture work in black walnut and curly maple. I haven't been able to find a satisfactory finish for the maple to make the curl stand out. I get my best results with a linseed oil finish, but it lacks the straw color that classical pieces seem to have. Would a little raw sienna help?

Also, in making a pie safe I used punched copper for a door panel. I'd like to give it a verdi gris finish. Can you suggest a way?

John H. Bunting
Lima, PA

There is no stain that will give your curly maple the rich tone of an antique. You're going to have to treat the wood chemically. The following is an old recipe:

Find a dozen or so cut nails (preferably rusty), and put them in a soup bowl with some apple cider vinegar—the stronger the better. Don't use a metal dish. Cover, and let stand for two weeks.

Make a second stain by dissolving potassium bichromate crystals in water. Apply the vinegar stain with a swab. It will dry a slate color and penetrate deeply into the softer portion of the wood. After it's dry, swab the surface with the bichromate stain, which will penetrate the hard stripes and color them a deep orange–yellow. It will also change the slate color to a rich brown.

Needless to say, you'll need to experiment on scrap in order to get good results. Also, consult various books for similar recipes. (I believe George Frank lists a few of these treatments in his book). I'd like to add a few tips of my own. First, raise the grain of your wood with hot water, and sand to perfection. This will minimize the grain–raising when you apply the chemicals. It wouldn't hurt to do this twice. After using the chemicals, rinse with water and sand with up to #600–grit wet or dry paper for maximum surface reflection and smoothness. Afterwards, apply a solution of half linseed oil (boiled) and half turpentine with a few drops of Japan drier. Rub it in briskly with a piece of burlap, then remove all traces of the oil. Dispose of any rags by submerging them in water and taking them outdoors—they're highly flammable.

If you find the wood color a bit too orange, bring it down with a homemade brown stain. Experiment with burnt umber and raw sienna oil colors mixed in turpentine with a little boiled linseed oil and a few drops of Japan drier.

You're on your way to a gorgeous finish. After about a week's drying time, apply a thin wash coat of white shellac and steel wool it with a pad of #0000. When dry, apply three thin coats of Behlen's Rockhard Tabletop Varnish (the company makes a compatible reducer). Lightly sand the last coat with #600-grit wet/dry paper to remove any imbedded dust.

Saturate a pad of #0000 steel wool in mineral oil, and rub down one surface at a time, sprinkling occasionally with rottenstone abrasive powder. Remove all traces of oil with soft rags (this oil isn't a fire hazard). This may seem like a lot of work, but with a wood like curly maple you need a perfectly sanded surface, the chemical treatment and a layer of crystal–clear, high quality varnish.

My practice is limited to wood finishing and for now I must leave it at that. To put a verdi gris patina on your copper panels, go to the library, find a book on making metal sculpture and refer to the section on finishing and patinating metal surfaces.

Tom Wisshack

Nooks and Crannies

I'm a newcomer to *Popular Woodworking* and thus far enjoy it very much. While reading your *Finishing Forum* the thought occurred to me that you may be able to help me with a problem, which, although not related to wood, might be solved with one of your formulas.

I have a circa 1910 National Cash Register made of solid brass. When I picked it up some years ago, I tried to remove the silver paint which a previous owner had applied to outside. Hardware store paint removers helped remove most of the silver finish, but since the register has a very ornate filigree finish, a lot of the paint is still in the cracks and crevices of the brass.

I want to restore it to its original condition by first completely removing any finish from the brass, and then bring the brass up to its original bright finish. Since brass is soft I cannot use any kind of metal bristle brushes for fear of scratching the surface.

Are there any formulations which could help me both remove the remaining paint and also remove the dull finish?

Jim O'Rourke
Medford, NJ

Yes, we do prefer wood–related questions, however, the basic solution to your problem is the same for wood or metal. There's a fairly simple technique that should remove the remaining paint from the intricacies of your antique register. Apply a heavy coat of paint remover to one surface at a time in a (preferably) horizontal position. I suggest using a remover that has a good "bite" such as Stripeeze. Cover this with wax paper and let it stand from a few hours to overnight, depending on atmospheric conditions.

Afterwards, you'll probably find that the paint has softened and you can hose it off—a high–pressure system will give the best results. Give it a soap and hot water scrub with a pure–bristle brush, then rinse.

The dull finish you describe may respond to a similar treatment. If not, you'll have to consult someone who does metal–finishing. Many of these old pieces were made of brass with a nickel plating and yours may be in some state of deterioration.

Hope this is of some help.

Tom Wisshack

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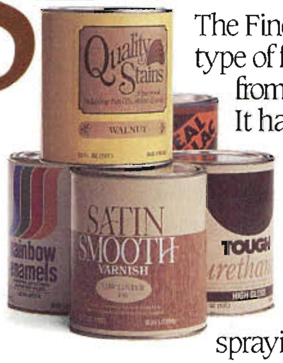

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by Joan Cassidy

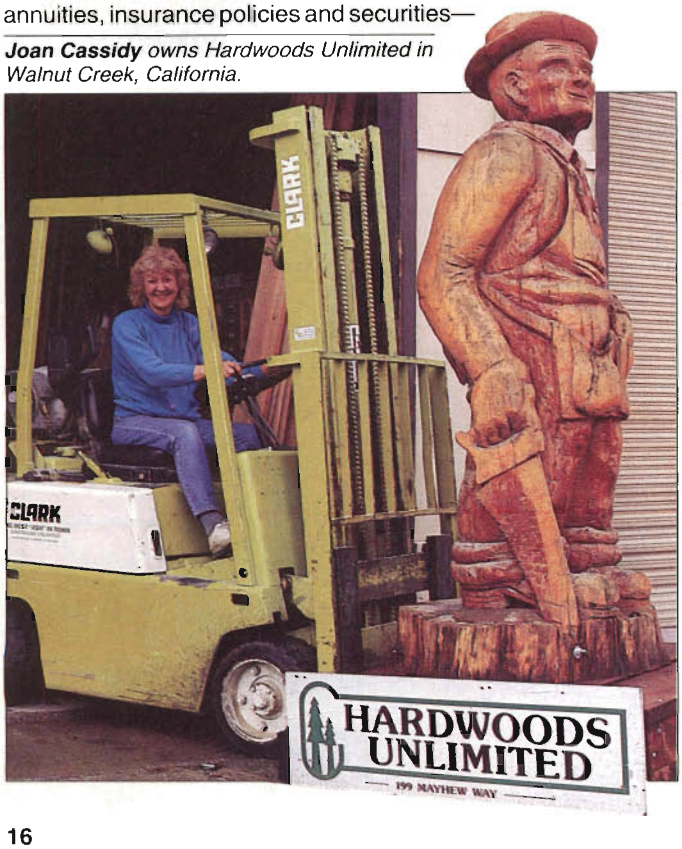
Owning A Lumber Yard

Armed with a BA Business and MA in Public Administration, I begin each morning at the wheel of my very own forklift, moving a 10–foot–tall cedar carving of Jake the Carpenter out to the street–side to welcome customers to Hardwoods Unlimited. Thrown away forever are the business suits, high–necked silk blouses and heels, replaced by jeans, T–shirt and sneakers.

The decision to move out of an 18-year career in the health field to purchase a lumber yard was easy. Negotiating the price and compiling the purchase package was easy. Trying to find a lender was impossible. No banks or investors, not even the Small Business Administration, were willing to take a risk on a business that had been a going concern for 10 years. The biggest negative I faced was that I had no experience in the lumber business or in retail sales. If I'd been able to obtain a loan, I'd have the necessary capital to operate and expand the business as needed. The old saying is true—if you don't need the money it's easy to get a loan. They could reduce the rate to 1% and I still wouldn't qualify. But, I was determined to get this business.

I had renovated several houses in the past and found Hardwoods Unlimited while upgrading my current house. My son, Sean, had been working for the then–current owner for a year. He did the millwork and eventually ran the place most days. One day he stopped by to tell me the business was for sale. From that day until I finally signed papers, it was almost all I could think about. My biggest problem was a lack of capital. I cashed in everything—annuities, insurance policies and securities—and between the seller, original owner and my sister, I financed the rest with a personal property loan and a second on my home. I was able to pay 42% in cash and had to finance the rest. In the end, I paid in excess of $70,000 for the business.

__Joan Cassidy__ owns Hardwoods Unlimited in Walnut Creek, California.



Bruce Richmond/photo

There I was, April 1, 1991, the proud owner of a hardwood lumber business, hardly a whisper of money in the bank, little inventory, and chaos and dirt aplenty—I felt good. I even felt good during May, when sales slumped to an all–time low. We were so busy trying to get things in order, we didn't even have time to panic.

I had all these good feelings because I was in the right business and my two adult children had joined me as partners. Never mind that we were in a recession, and the financial statements that I had based my purchase on weren't accurate. Every decision we make is a risk. Sometimes you just need to trust that old gut feeling that says, "do it." On the other hand, when you can't visualize yourself in the position or don't believe in the product your attitude will doom you to failure.

I have often read and heard that having family members as partners does not always work out well. What's important when working with family members is allowing each person to remain an individual and to seek their own level of expertise. This includes determining their own motivational forces and self respect. I had been a manager and administrator for years and could have come in with a know–it–all attitude. But approaching new situations with that attitude immediately stifles creativity and ideas, and instills resentment. Each of us learns by trial and error. To have someone tell you what to do will only channel those efforts down a narrow pathway. To allow trial and error allows individuals to gain confidence, share ideas and have a neutral forum to discuss mistakes.

Down to Business

The business was started with no working capital, no chance of a loan, in the thick of a recession and with almost no inventory; we needed a plan. We knew one fact; lumber, plywood and moulding sales weren't going to pick up substantially in the near future. Now that the bad news was on the table and the sun still came up in the morning, we had to concentrate on the positive actions that would directly filter to the bottom line. We needed to increase product usage, investigate new products and expand our current offerings. We had to engage in plain–old customer service and institute an advertising and marketing plan. Simple, but essential stuff if you want to survive.

First, we increased lumber usage by increasing our millwork and custom jobs. We use our hardwood inventory to make large and small items for customers—from kitchen cabinets to boat parts, and fireplace mantles to furniture repairs. We increased our lumber usage and added a service we can charge for: milling. Even with this charge, our pricing is well below that of manufactured products. In the 9 months we've been in business, we increased millwork 350% over the prior ownership. We're also helping a young man start his own cabinet shop—and in trade, he helps us. So far the millwork has kept us afloat to pay our bills.

Under the previous owners, the business was already established as a dealership in several products, and we've increased the number of products—windows, doors and flooring—we represent. When you become a dealer for a product, you have a lower markup, but it takes less time for a sale than your regular wood products. This can become a profitable part of the business and also helps through tougher times. We've kept the focus on hardwoods; any products that weren't hardwoods were eliminated.

Customer Service

Since we didn't have a lot of money for advertising and marketing, we decided our best efforts ought to be directed toward plain–old customer service. Customer service does not translate to the customer always being right; it has several ingredients. You have to have a genuine liking for people. You must know and believe in your product totally, and you have to go that extra step. Even if the customer doesn't buy from you, they will come back. It's difficult the first time you send a customer elsewhere because your product doesn't fit their needs (even though you could have talked them into it). But you'll know you have a sale when you see them the next time.

We spend a lot of time with people—on the phone or in the store. When we don't carry what they are looking for, we try to direct them to the right source. I know these people will become customers when they have a hardwood need, and they'll tell a friend about us.

The concept of the customer being right doesn't really apply. What does matter is communication—you must have a clear understanding of their needs, and the customer must have a clear understanding of what you can provide. This dialogue brings the exchange that is true customer service. If you can't get along easily with people, get someone who can. Use a foil, hire someone, or beg a friend to carry out certain tasks.

Advertising and Marketing

Hundreds of books have been written about advertising and marketing telling you what works for the individual who wrote it. We have used almost every spare dollar to advertise and haven't done half of what we should. But when we have an extra $300 (one ad, one time, in one newspaper), we spend it.

Don't get caught up when advertising sales reps call. Have a plan before you begin. They sell expensive advertising and have persuasive ways of hooking you. Know what your target allocation is, so when they call, you can say specifically that they're not in the advertising budget for this year—call back next year. Don't be angry, just definite. If they continue, tell them one more time. If they still don't get it, I ask that they remove my name from their list.

When you begin looking into advertising, it can be a rude awakening. The yellow pages for our county overlap, which means that if we want to cover the whole county, we have to put an expensive ad in four to six books (I've lost count). Heaven help you if you sell different categories of products—something about the word *exponential.* But, in our case, 70% of our new customers find us in the yellow pages. Newspaper advertising can present the same problem: to cover a whole county you have to place ads in several local editions.

You need to consider what areas you want to cover and who you're trying to reach. If your market is specific, can you purchase a mailing list that spends your dollars wisely? Can you make prospecting calls effectively or advertise in a throw–away paper? Will radio or TV spots reach the right people? Will your local government allow you to use adequate signage? There were a lot of questions we had to ask ourselves in order to spend our money wisely in these areas.

All in the Family

Since we took over the business, Sean, Lisa and I have been working long hours six days a week, and we found several problem areas. We started making little mistakes, getting short tempered with each other, and none of us particularly enjoyed our day off. It's okay to spend that kind of time for definite periods—but not continually. Everyone needs renewal, and there's more to life than work. We've found that with only one day for chores and errands, and no time for relaxation, you begin to dislike what you do. We're beginning to take some half days; it helps.

In regard to being a woman and owning what is generally considered a man's business, I'd like to say that one business is really no different from another. They all have the same elements: revenue, cost of sales, expenses, profit and loss. My daughter and I hoist lumber, cut and plane it. The men assist sometimes, and we accept that. Most often, they know it's part of the job and are comfortable just letting us do it. We laugh about our increasing muscles.

Since I bought the lumber yard, it seems that more and more women come in and purchase lumber for items they're making. A lot of women tell me they're taking woodworking classes. More and more women are going into business for themselves; it seems to be a natural state of affairs. When someone feels uncomfortable with Lisa or me, they gravitate to Sean.

Sean is 23, has been a woodworker for five years, and has had the experience of running the shop for the former owner. He's begun to change his mental image from rock–and–roller to proprietor. The hair is long, the jeans are torn, and he is a little on the scruffy side—but customers are impressed with his expertise, and he can clearly conceptualize their ideas.

Lisa, 27, has had a variety of good jobs and came to the conclusion that she's the best boss she ever had. She's tough, but nice; and is astute at sales and keeping the books.

As for me, my role is made up of bits and pieces; sweeping, dusting, doing the books, making coffee, taking inventory, paying the bills, panicking and worrying. And they all make me feel really good. PW

Book Reviews

by Hugh Foster

Grimshaw on Saws by Robert Grimshaw (Astragal Press, Box 338, Morristown, NJ 07963-0338) 177 pages, paperback, $19.95

This book, originally published in 1880, sported the subtitle, "Concerning the Details of Manufacture, Setting, Swaging, Gumming, Filing, Etc., Care and Use of Saws, Tables of Gauges, Log Measurements, List of Saw Patents, and Other Valuable Information." By the time the book was written, sawing had been pretty thoroughly developed. All that's been done since then is to make sawing affordable and even avoidable.

If you realize how much technology has changed yet stayed the same over the past century, you'll be fascinated by this volume. It deals more with hand saws and saw blades than with saw mechanisms. The blade is what does the work. It seems we've made less progress than we might like to think these days. The Victorian writing style is less interesting than the excellent illustrations. The last seventeen pages are old catalog ads for saws and related products and help set the period for the book.

Working with Mica by Robert K. Conn (Woodworker's Supply of New Mexico 5604 Alameda Place NE, Albuquerque, NM 87113) 126 pages, oversize paperback, $17.95.

Mica is what the professionals call Formica® and other brands of high pressure laminate. This is the first book on the market that goes into detail about how to work with this increasingly present material. The author suggests that if we add equal parts of patience and pride with his instructions, we'll find mica to be an easily worked material that doesn't require a lot of special tools or equipment. Conn's book shows the reader tricks that are real confidence–builders. There are safeguards that can be built into the laminating process to reduce the risk of damaging the material and surface with an alignment error.

In the opening pages, Conn discusses the materials that can be laminated and the methods of storing and handling the material before it's time to mount it. The second section tells how to apply the material to curves, cylinders, and flat surfaces. A chapter appropriately called "Oops" tells what to do when the mica is misaligned—there is a way to pull it off without destroying both the laminate and substrate. The third section is about trimming, shaping, filing, and routing the laminates to fit your needs. A fourth section details patterns, scribing and fitting for occasions when you might want to create

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Hugh Foster is a woodworker in Manitowoc, Wisconsin, and the author of The Biscuit Joiner Handbook *(Sterling Publishing, 387 Park Ave. South, New York, NY 10016).*

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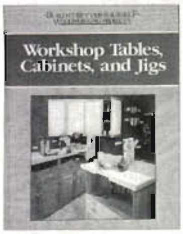

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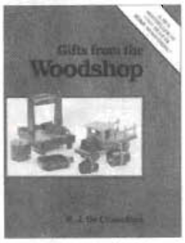

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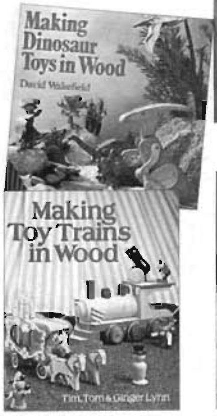

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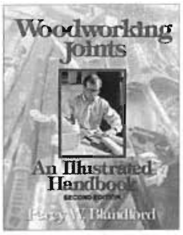

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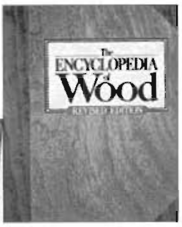

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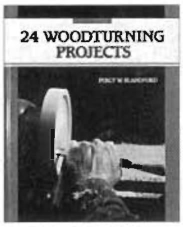

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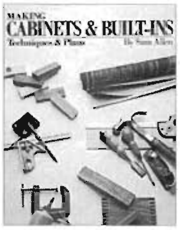

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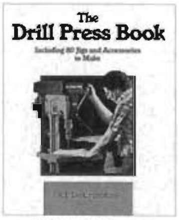

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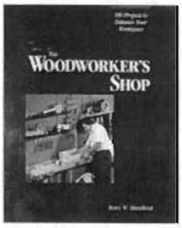

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LAP5

a design by performing "marquetry" with different patterns of laminate. The final chapters tell how to resurface a kitchen. Appendices show how to lay out the material for cutting with minimum waste and how to make several kinds of useful accessories for laminate application.

Cabinetry: The Woodworkers Guide to Building Professional-Looking Cabinets and Shelves edited by Robert A. Yoder (Rodale Press, 33 East Minor St., Emmaus, PA 18098) 352 pages, hardcover, $26.95.

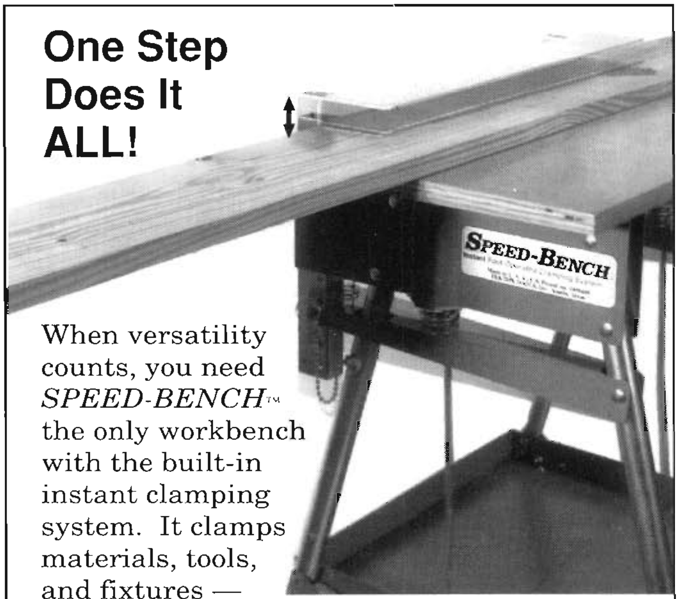
Rodale has been bringing us a handsome series of woodworking volumes over the past couple of years. *Cabinetry* includes over thirty projects and a dozen chapters about specialized techniques like "Making Crown Moulding," "Mitering a Beaded Frame," "Cope-and-Stick Joinery," and the like. Handsomely illustrated with hundreds of photos and multi-colored drawings, the book all but assures the success of those who build these projects. The book's first project has fifteen drawings, four photos, one "quick tip," an excellent parts list and a very clear, well organized nineteen–page text.

This book is a solid teaching text. A novice woodworker could learn enough while building these projects to no longer be ranked as a novice—and there would be a whole house full of attractive furniture and built-ins thrown in for good measure. It'd take a real effort not to find something in this book that you would like to build.

Japanese Woodworking: A Handbook of Japanese Tool Use & Woodworking Techniques by Hideo Sato—*translated by Koichi Paul Nii*, (Hartley & Marks, Inc., P.O. Box 147, Point Roberts, WA 98281) 196 pages, paperback, $?.

Available since 1987, Sato's *Japanese Woodworking* finds a place on my bookshelf as the clearest volume about Japanese woodworking that I know of. Sato describes house building, furniture projects and Japanese joinery in depth. Many of the joints are so fancy that I'd be thrilled to show them off in my projects. For most Americans, using Japanese joinery is an exercise in "Look what I can do," but in Japan many of the joints exist because of scarce affordable timber supplies.

The book is illustrated with line drawings rather than photos which show how to cut the joints while explaining the theories that underlie them. The authors suggest that the reader use the book as as a guide to fine-tuning personal work habits. Basic skills can be forged and tempered like fine tools until they are effective, controlled and as safe as possible—producing first–class work. Learning begins in the workshop through experience, soaks in by repetition and becomes second nature over time. PW



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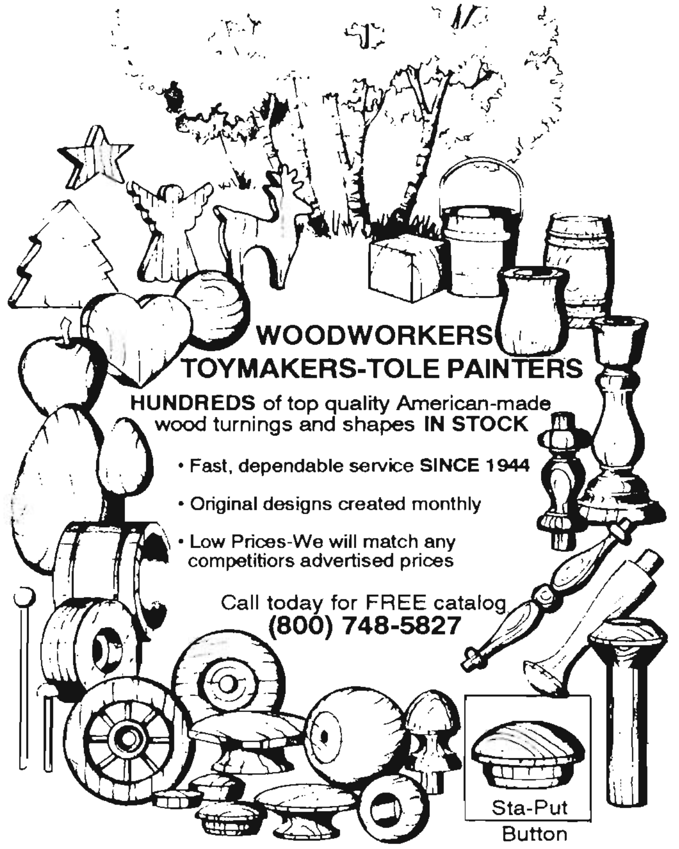

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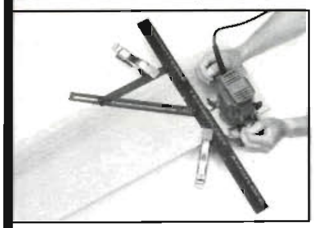

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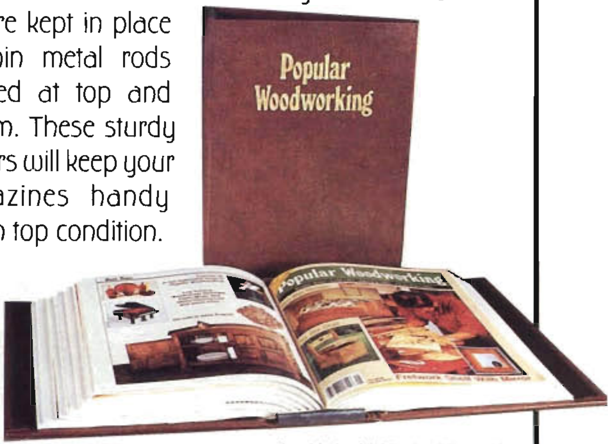

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Videoscene

by Alan Marks

The Complete Incra Jig Video, ©1991 by Taylor Design Group, P.O. Box 810262, Dallas, TX 75381, $19.95, 60 minutes.

Before reviewing this tape I didn't know what an Incra Jig was.

I discovered the Incra Jig to be a relatively foolproof attachment for making dovetails and box joints. It is used with a router table, drill press, or table saw. It enables you to make regular box joints and decorative elaborations on that theme, and in the dovetail category, it makes through, half-blind, and sliding dovetails.

The jig consists of a frame and slide that indexes into position incrementally to accurately space your cuts. A selection template for each joint variation guides the user through the steps needed to produce it.

This professionally edited tape uses a bagful of slick and entertaining video tricks to get the point across. I received a jig with several accessories to help me access the video—they are sturdily–made and well designed. The video does an excellent job explaining how to use the jig. Taylor Design manufactures and sells the Incra Jig—it can be ordered through Woodcraft or bought at various woodworking stores.

1991 Wood Products Seminar,©1991 Tennessee Valley Dry Kiln Association, $10, 180 minutes (address orders to William Parrish, Forest Resources Development, Tennessee Valley Authority, Norris, TN 37828)

This informative tape is an audio/visual record of the seminar sponsored by the Tennessee Valley Authority and is produced and distributed as an educational public service. It lacks all the professional whistles and bell, nonetheless, it contains information essential to anyone contemplating drying his own wood. And the price includes shipping.

Topics covered include air drying, pretreating green lumber to prevent checking, types of kilns and drying methods, stacking and stickering, measuring moisture content, drying schedules and rates, what happens to wood as it dries, grading lumber, wood storage and handling, and much more. And that only covered the mechanics of the wood drying process.

Most valuable, was the talk on conducting a business profitably. Anybody intending to market a product could benefit from listening to this lecture. I wish I had heard it twenty years ago.

The message runs something like this: unless you are marketing something at a profit level which meets your needs and which you are capable of supplying to someone who wants it in large enough quantities to sustain your operation, you can never succeed. Also there was sage advice about becoming dependent on a single customer or supplier, financially pre–qualifying new customers, and monitoring market conditions in order to determine inventory and investment requirements.

It amazed me to learn how few people in the wood-drying business depend on the moisture meter. To monitor moisture content when drying green lumber, the industry uses a more accurate method that requires no specialized equipment and is fully described in the video.

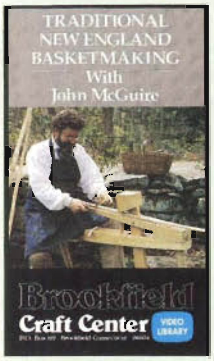
If you have ever been interested in having a small solar kiln, the video explains the advantages and disadvantages and who manufactures the units.

Even if none of the things that caught my attention intrigue you, if you're curious about what the wood went through before you picked it up at your lumber yard, this video is an excellent way to find out.

Colonial Footstool Video and Plan, ©1991, Delta International Machinery Corp, 246 Alpha Drive, Pittsburgh, PA 15238, (800 438-2486) $19.95, 28 minutes.

Before looking at the video I read the accompanying plans. They are nicely formulated and are easily understood. This is a good beginning project for the lathe. It incorporates spindle turning for the three legs and faceplate turning for the 12" diameter stool seat. The finished stool stands about 9" high.

Scott Phillips is our guide to colonial stool-making. It is obvious from the start that he had memorized a script. My confidence in Mr. Phillips' authority suffered



Traditional New England Basketmaking with John McGuire, ©1990 Brookfield Craft Center, Box 122, Brookfield CT 06804, $39.95, 90 minutes.

Interested in making or just knowing about traditional splint baskets? This volume is a definitive work on the subject. Everything you need to know is contained here—selecting and cutting the proper tree from the forest, pounding the log to separate the splints, weaving and shaping and finally, handle making.

Two types of baskets and handles are demonstrated, and credit is given to the early Native Americans for the techniques they brought to the craft. Close attention is paid to every detail; both in word and with lots of clear, close up camera shots. You're shown how to use a draw knife and froe, and given the best methods for each phase and alternatives wherever appropriate.

John McGuire's delivery is thoughtful, methodical, and evenly paced. The instructions and explanations are delivered in a straightforward, soft–spoken manner. Although slightly uneasy in front of the camera, John's knowledge and expertise shine through—you can tell he's been making baskets a long time. He's written three books on the subject and is responsible for the basketry programs at Old Sturbridge Village and the Hancock Shaker Village Museum.

This tape captured my full attention for the whole 90 minutes and although I may never build a basket in this fashion, I now know how. If you want to make your own baskets or just like knowing how things like this are made, this video is a must. —Rob Cook

---

***Alan Marks** designs and builds furniture in Carmel Valley, California.*

because of his impersonal delivery and lack of information about his background.

Phillips begins with a basic rundown of the parts and the operation of the lathe and the tools. Scraping tools are easier to use and require less skill, they predominate this project. I don't agree with his choice of tools—much of the enjoyment in turning comes from producing a clean cut using an edge that produces feathery shavings.

Basic instructions continue with preparing and mounting the workpiece. Safety considerations, the correct way to hold a chisel and the proper choice of material are demonstrated.

A template is used to transfer the shape of the leg, with instructions found on the plan sheet tucked inside the cassette case. Points are transferred to the spinning workpiece with a white pencil to establish cut-off points and places where measurements are taken to reproduce the profile. These points are turned to specified diameters and are checked periodically with the calipers. It was unclear how the parting tool was manipulated—camera closeups would have been invaluable. To finish the turning of the legs, Phillips uses scrapers, rounded and vee–shaped.

After mounting the blank on a faceplate, the preliminary rounding of the seat is done with a gouge. The need to change the lathe setup to accommodate the faceplate was not mentioned. A round–nosed scraper was used to slightly dish the surface of the blank. Phillips ends with a sharpening demonstration on a wet-wheel grinder.

I appreciated the lack of marketing hype in the presentation. The novice turner looking for a first project, or the high school woodshop teacher seeking instructional material would certainly find this video appropriate for the purpose. PW

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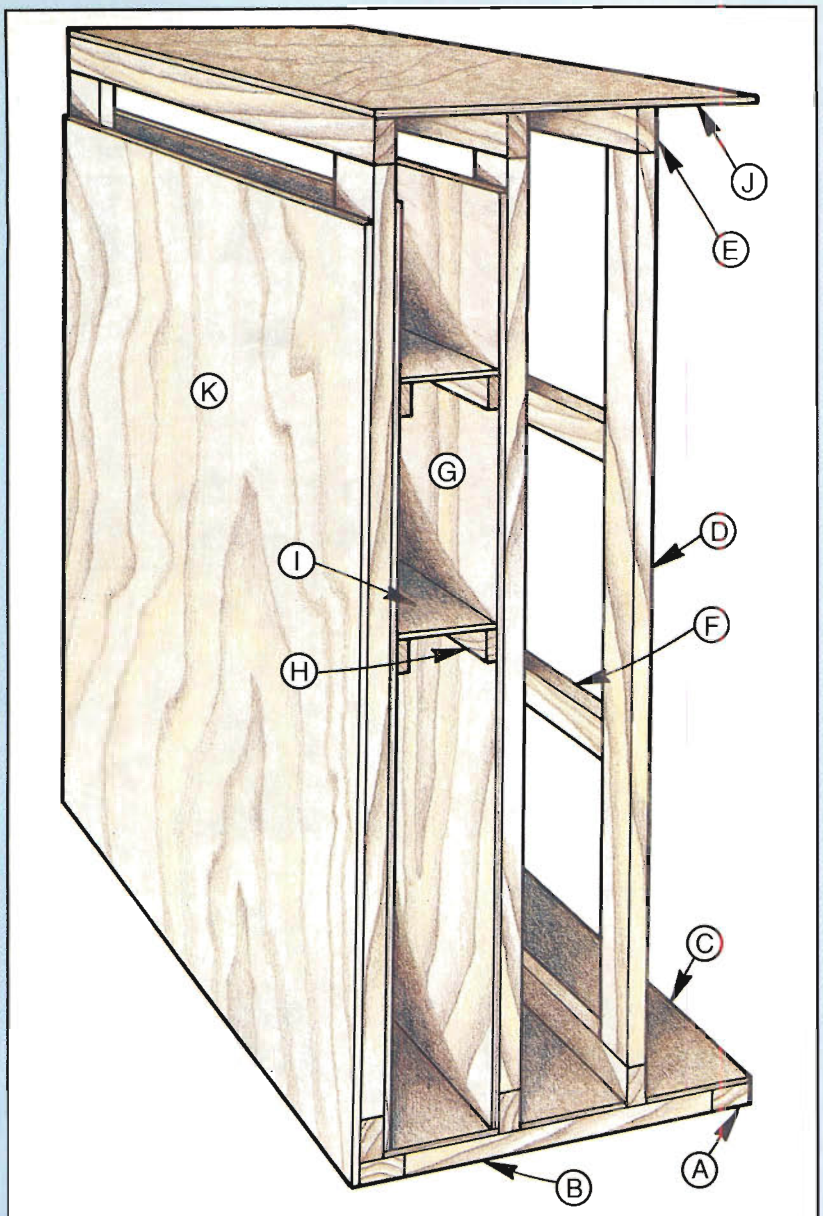


Figure 1. The Tall Version

Lumber & Plywood Storage Rack

by W. A. "Link" Lincoln

For years I would pick through my growing lumber pile looking for that elusive piece—it always turned up on the bottom. I inevitably moved most of the pile each time went looking. I kept all my plywood leaning up against a wall and had to fight with the stack to get the piece I wanted. When I moved, my new shop space was so small I was forced to build a rack to organize all my lumber. Needless to say, I should have built it years ago.

Pre–cut all the parts before assembly and you can complete this project in one day. If your shop ceiling is less than 8' 10" high, you'll have to make the horizontal version presented in the sidebar on page 26 instead of the tall version shown in Figure 1. You need 6" of clearance inside the rack to maneuver a full sheet of plywood and 4" of clearance for the rack frame. When you position the rack in your shop, remember to leave yourself enough room to get the largest and most awkward pieces in and out without having to move everything.

For this project, buy fourteen 2 X 4's eight feet long, one three–foot 2 X4, and one 8–foot long 1 X 6. In plywood, you need one sheet of ½" AD, one of ¼" AD, and two sheets of the most inexpensive paneling you can find.

For the base, cut the two ends (A) and the four spacers (B) to length and lay out the pieces on your shop floor as shown in Figure 2. Toenail them together—the floor pieces (C) will provide stability to the frame. Place one floor piece 1½" away from the edge of the 48" side of the base and nail or screw it to the frame members. Set the base aside.

Lay two uprights (D) and two ends (E) on the floor and insert the two spacers (F)—their location is not critical (see Figure 2). Toenail the members together. Lay a liner (G) on the frame ½" up from the bottom of the frame and nail or screw it down. Make the middle frame in the same manner. The remaining frame is the same but without the liner (see Figure 1).

Rip the 1 X 6 in half and cut those pieces in half for the shelf cleats (H).

Link Lincoln is a retired mechanic, tool salesman and shop teacher in Folsom, California.

Lumber & Plywood Rack Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
2	A	1½"	3½"	48"	base ends
4	B	1½"	3½"	27½"	base spacers
3	C	½"	10"	48"	floor pieces
6	D	1½"	3½"	96"	uprights
6	E	1½"	3½"	48"	ends
6	F	1½"	3½"	41"	spacers
2	G	¼"	48"	96"	liners
4	H	¾"	2½"	48"	shelf cleats
2	I	½"	10"	48"	shelves
1	J	½"	35"	48"	top
1	K	¼"	48"	96"	facing

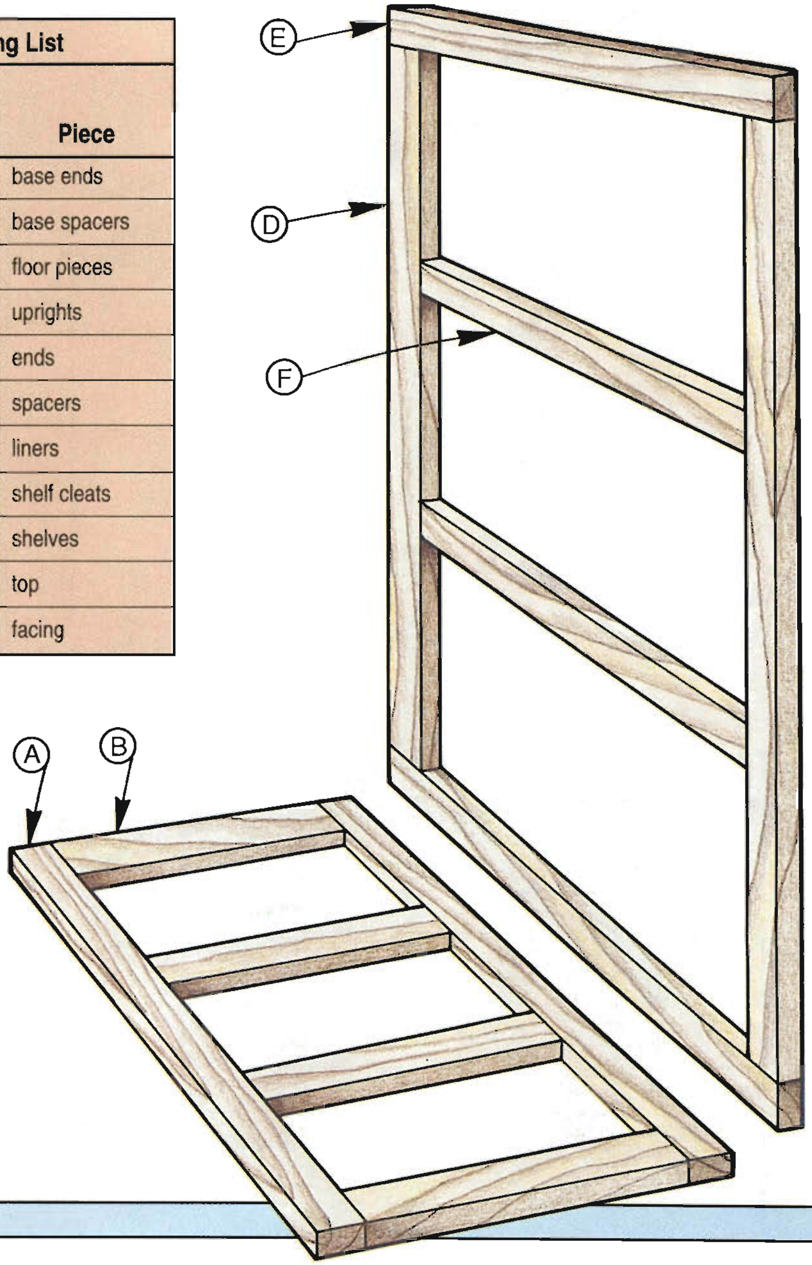


Figure 2. Frame Assembly

Bob Chapla and Ginny Pruitt

Attach the cleats on the liner side of the two frames as shown in Figure 1. Screw the lower cleats to the frame uprights at least 52" from the bottom to allow clearance for at least a half sheet of plywood. Set the level of the second shelf to fit your needs. If there's a spacer behind the cleat, screw into the cleat, through the liner and into the spacer with 2" screws. Otherwise, use #6 X 1" pan head screws driven through the liner into the cleats. Use at least four screws per cleat. You may install additional cleats at several various heights for adjustable shelves.

Assembly

Stand the base assembly on edge with the ends (A) vertical. Lay a lined panel on

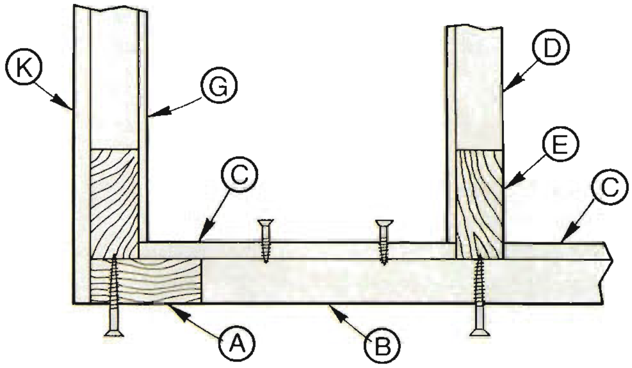
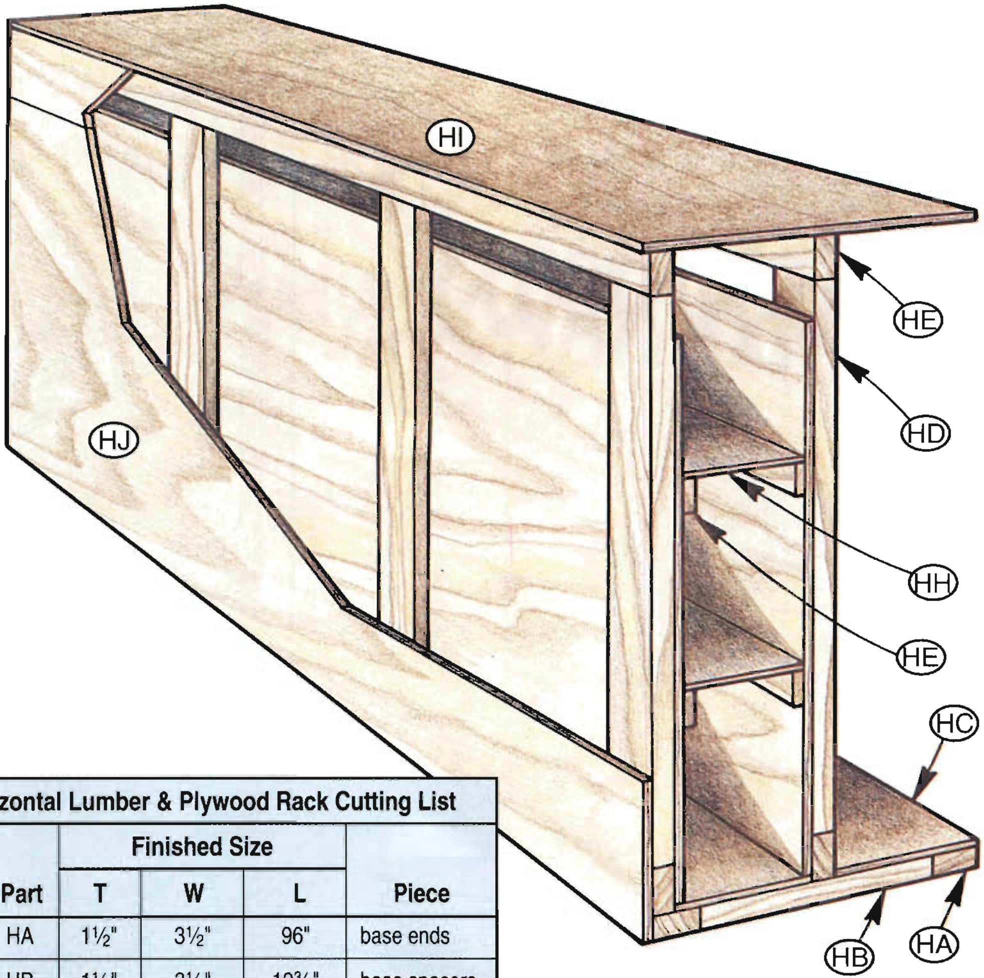


Figure 3. Lining The Frames

Bob Chapla and Ginny Pruitt



Horizontal Lumber & Plywood Rack Cutting List

Qty	Part	Finished Size T	W	L	Piece
2	HA	1½"	3½"	96"	base ends
4	HB	1½"	3½"	19¾"	base spacers
2	HC	½"	11⅞"	96"	floor pieces
8	HD	1½"	3½"	48"	uprights
4	HE	1½"	3½"	96"	ends
2	HF	¼"	48"	96"	liners
4	HG	¾"	2½"	96"	cleats
2	HH	½"	11⅞"	96"	shelves
1	HI	½"	27¼"	96"	top
1	HJ	½"	48"	96"	facing
1	HK	½"	8½"	96"	facing top

Horizontal Storage Rack

Construct this horizontal rack following the same methodology as the tall version. The materials list is slightly different—you need eleven 2 X 4's 8' long, three sheets of ½" AD plywood, and two sheets of inexpensive 4 X 8 paneling. Follow the Cutting List and Figure as you assemble your rack.

Position the rack so that you have access from both ends. If you can't make it fit in your shop with both ends open, then attach a 57" X 27¼" piece of plywood to the inaccessible end for added stability. **PW**

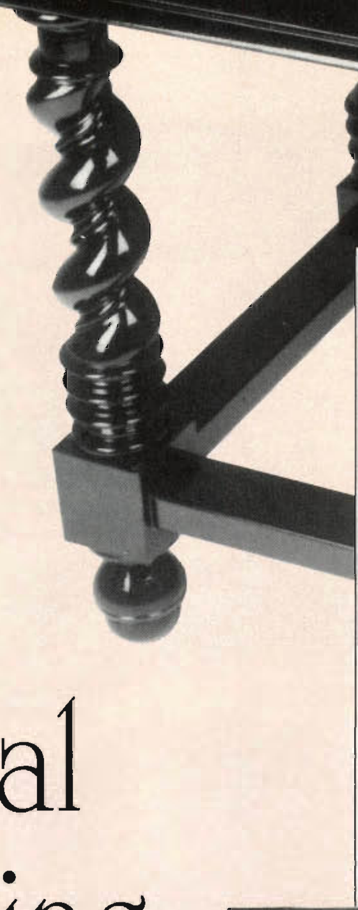
edge and abut it to the base as shown in Figure 3. Ensure that the frame is flush with the edge of the base and that the liner overlays the ½" floor. Secure the base to the frame with 3" screws. Set the other lined frame in place ao that the liners face each other. Attach it from under the base with 3" screws. Place a floor piece (C) up against the middle frame, and secure it to the base. Install the last frame (unlined) up against this floor piece and then attach the last floor member.

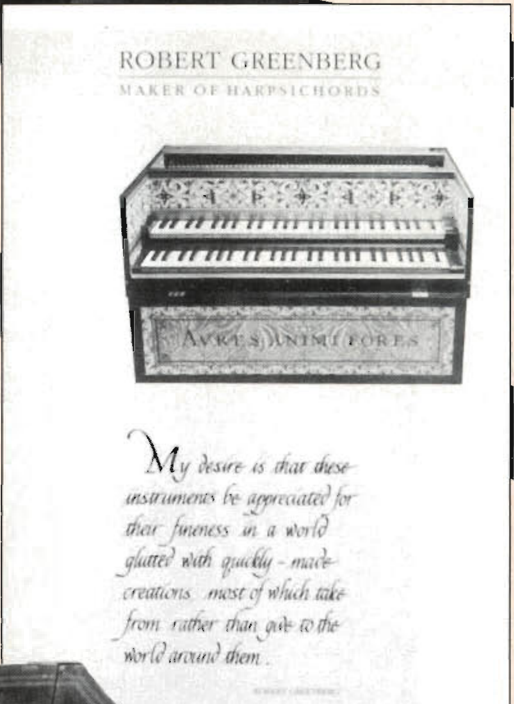
Set a shelf (I) on adjacent cleats between the outside and middle frames for spacing, and attach the top (J). Flush the edge of the top with the outside frame and attach it. Check that the spacing to the middle frame is 10", and secure the top to it. Repeat for the unlined frame.

Stand the rack upright by first turning it on its back, outside frame on the floor; then lift up on the top. Get help so your back doesn't keep you up all night. Move the rack to its final resting place with the open end against a wall. Once in position, attach the facing (K). The facing doesn't cover the side completely; use 8½" of the left–over ½" plywood to fill the void if you wish.

A coat of water seal will add to the life of your new lumber storage rack. **PW**

Spiral Turning

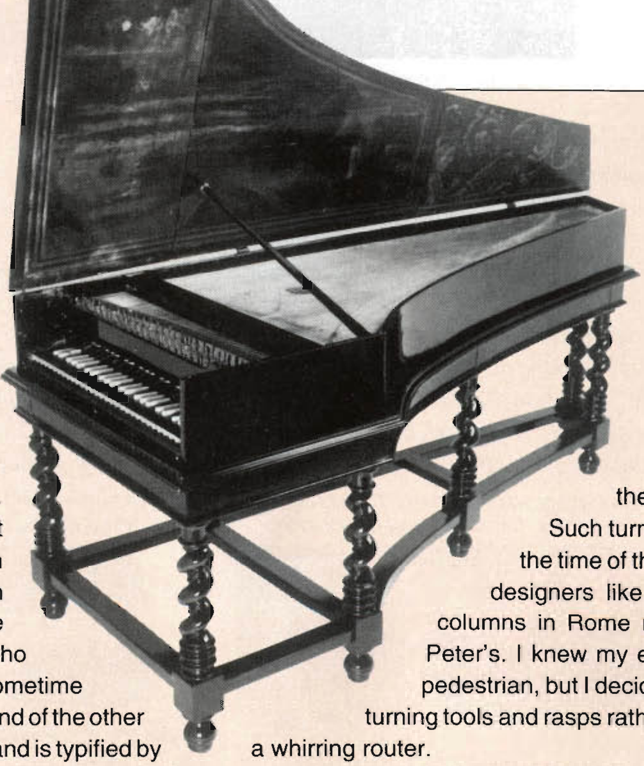




ROBERT GREENBERG

MAKER OF HARPSICHORDS

My desire is that these instruments be appreciated for their fineness in a world glutted with quickly-made creations most of which take from rather than give to the world around them.



by Robert Greenberg

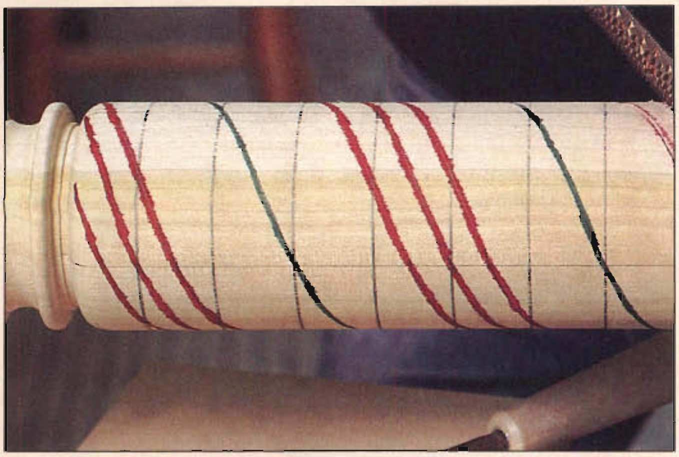
Harpsichords are keyboard instruments of an earlier period. Antique harpsichords are rare, especially so on the West Coast where I live. I've been a maker of them for twenty years. Within the past five I've been lucky to have a number of jobs restoring antique instruments to playing condition. Recently I undertook the demanding project of restoring a seventeenth century French harpsichord. There are only twenty of them in the world, so I proceeded with caution. One reckless thing I did was to tell its owner, who didn't like the stand it had been given sometime around 1960, that I could copy the style of stand of the other surviving early French harpsichords. This stand is typified by spiral turnings connecting its upper and lower trays, which follow the shape of the instrument above them.

To make seven spiral turnings and incorporate them into the rest of the stand required weeks of planning and effort. Should you be thrilled with the idea of making spiral-turned legs, I can offer you a few hints from my experience.

I started from scratch, rejecting the use of my Router-Crafter device, and planning instead to learn how to make the legs with hand tools like the original makers used. Such turnings were popular during the time of the Mannerist painters and designers like Bernini, whose twisting columns in Rome rise over the altar of St. Peter's. I knew my efforts would be far more pedestrian, but I decided to attempt the job with turning tools and rasps rather than with wires guiding a whirring router.

In the photo of the finished project, the stand is everything below the furthest-projecting moulding above the twisting legs. I copied the stand of another French instrument with the help of a plan from the museum housing it. Drawing templates for forming the curved sections accounted for a large part of my time. Some of these curved sections were sawn from thick solid stock, but others had to be bent to shape on a massive bending iron.

Robert Greenberg *builds harpsichords in San Francisco, California.*

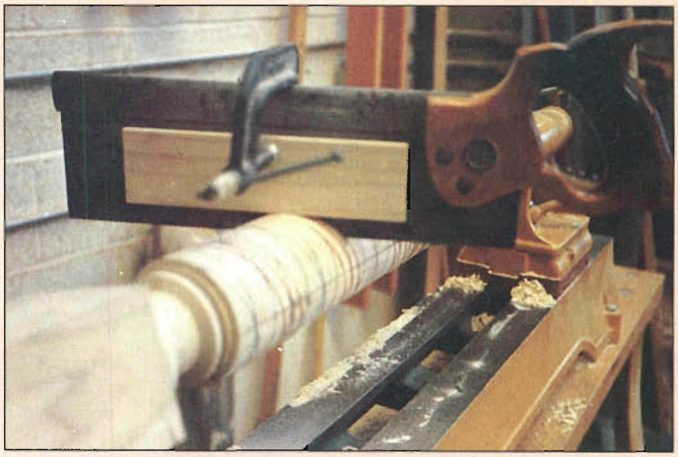


The grid lines make possible accurate layout of the double spiral. Here the green line locates the major spiral's high point.

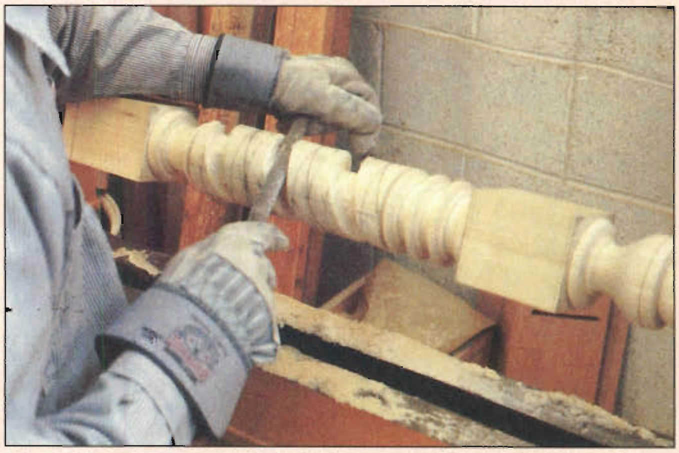
The seven legs themselves started as blocks of yellow poplar about 3¾" square (glued up from two planks of 8⁄4 stock). I finished the actual (spinning) turning first on a friend's Rockwell lathe. Layout of the spiral sections came through trial and error. Although many books on lathe work refer to spiral work, I came up with a system others might want to adapt for themselves.

To work the rough cylinder into a spiral, I measured it and stepped off twelve equal spaces. Using the lathe's index head, I completed the layout grid by drawing four equally spaced lines the length of the cylinder. In the photo to the right you can see the square pommels that will become integral to the upper and lower tray sections of the stand. On the central cylinder are the grid lines for laying out the spirals.

What made them especially difficult was that each leg actually has two spirals—a major spiral, whose outermost dimension is the width of the square pommels, and a minor spiral amounting to a small projection running in the valley between the turns of the major spiral as it winds around the stock. That's why the photo of the layout (above) shows three equally–spaced spiralling lines (drawn in red) crossing through the grid lines. The best guide for making these lines proved to be a flexible drafting square. A very flexible plastic ruler would work well, too.



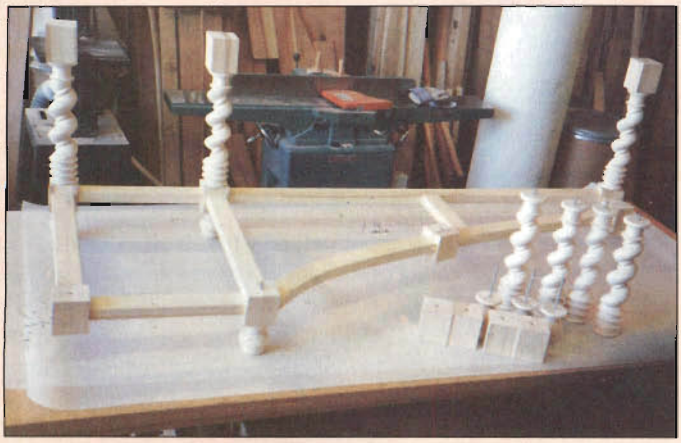
A scrap fence clamped to the saw set the cutting depth as I cut into the cylinder to form the sides of the major spiral.



Roughing out the waste required horse rasps, heavy gloves, a secure index head, and bolting the lathe to the floor.

Once you've got the lines, you're ready to do something with them. Remember that you're working on a lathe but the last thing you want is for it to run! The lathe acts only as a large clamp to hold the workpiece as you form it slowly with rasps, files and sandpaper. All the work ahead will be hand–powered, so unplug the motor before going further.

In front of the ball feet are the upper square sections. I've also cut the lower ones free and joined them into the lower tray assembly.

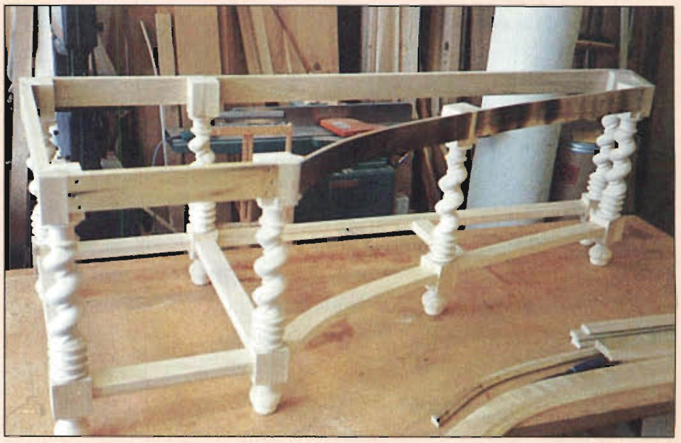


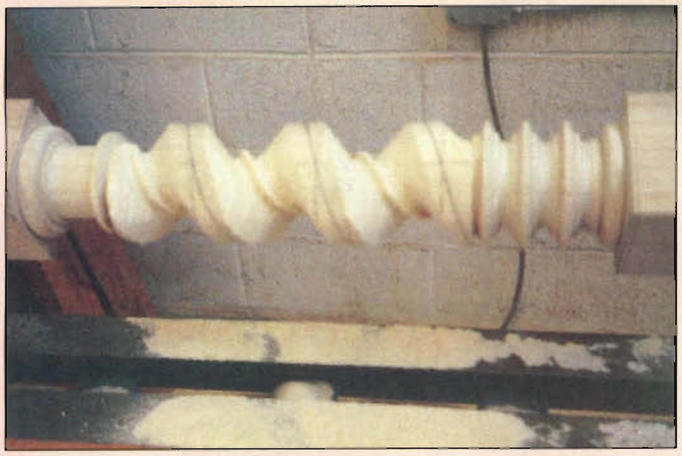
author

Saw down to the peak of the inner, smaller spiral with a handsaw. I used a backsaw and limited its depth of cut by C–clamping scraps to it. This is trickier than it might seem. The line is curved, so it helps to keep the cut as shallow as possible. Deepening the cut will force the saw to waver significantly and make following the cut–line difficult.

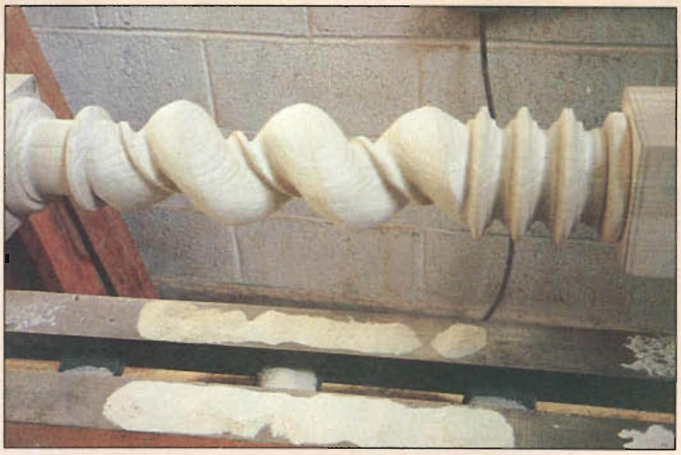
With the cuts completed, you're ready to work with the rasps. You want the meanest and biggest–toothed ones you can find. These are called **horse rasps** and must be used with very heavy leather gloves. Plan on destroying the gloves during the project.

Modern screws join the upper and much thinner tray pieces, while full mortise and tenon joints secure the lower members.





I've finished outlining the inner spiral with a round rasp. Note how the saw cuts down the sides of the spiral have been beveled back.

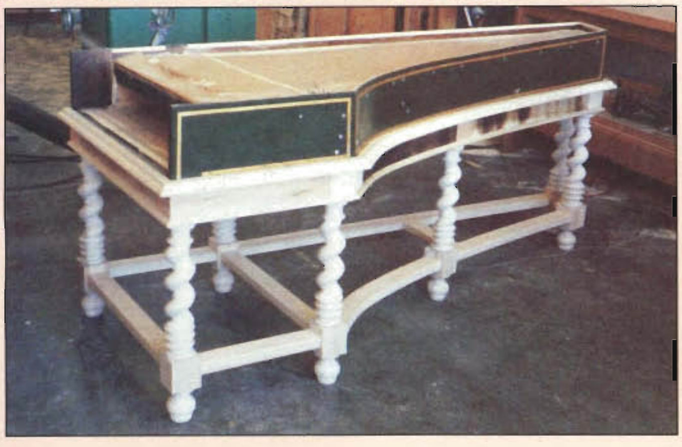


Once the inner spiral was shaped, I went back to the major spiral, extending and curving the bevel with the heaviest rasps.

You'll also need the lathe's index head in good shape so you'll be able to bear down as hard as you can on each rasp stroke. The photo to the left shows the initial cuts straight down along the sawn lines into the cylinder. After these cuts are levelled, the next chore is to bevel them somewhat, say 20° back from vertical to the bottom of the cut. Now you've got space to go in with a round rasp and cut the outline for the inner spiral. Then you go back to forming the major spiral by extending your first bevelling, all with your heaviest rasp. It's easy to bang into the turned portions at either end of the cylinder with the heavy rasps—try not to do it too often.

How to terminate the spirals will suggest itself as you go along. Each of my seven legs differs from its mates in being smoother or more angular in ending the spirals and feeding them into the rotary sections. The photo above and to the right shows what a leg looks like after the abrading work. The deep scratches from the horse rasps are removed by successively finer rasps and files. You'll want to be able to walk around your unpowered lathe at all times to keep from ever having to work the wood against the grain. One design issue will become apparent immediately. You could consider these spirals as screwthreads. Their pitch must slope so that it doesn't back up on itself. That is, you'll have to remove a lot of stock when you're rounding off the higher portions of the spiral, or the remainder will overhang the lines flowing from the work. It took me two full days to work the first leg to near–completion. After the legs were turned and spiralled, they had to be cleaned up with sandpaper.

Modern screws join the upper and much thinner tray pieces, while full mortise and tenon joints secure the lower members.



One of the sillier things I did in designing this stand was to try to improve on its antique model. I wanted to install a system of threaded rod and mating inserts, so that the stand could be broken down when the instrument was shipped back to Paris. I cut the legs apart. The top portions form part of the upper tray, while the lower section is made up of stretchers between the squares cut from just above the ball feet. The photo below, far left, shows the upper square sections in a row, with the ball feet cut free from the lower square sections. They've all been mortised and joined into the lower tray unit. The spiral turnings stand with a threaded rod projecting from each. In their bases are threaded inserts. Although this take–apart design made painting easier than it would have been dealing with a single mass, adjusting and aligning the parts joined with the threaded rods was difficult.

I was delighted when the stand achieved a concrete outline. The lower members are joined with full mortise and tenon joints. The upper and much thinner tray was joined by modern wood screws. After fixing the many feet of moulding around the upper squares of the spiral legs, I was pleased to find that the antique harpsichord fit the stand.

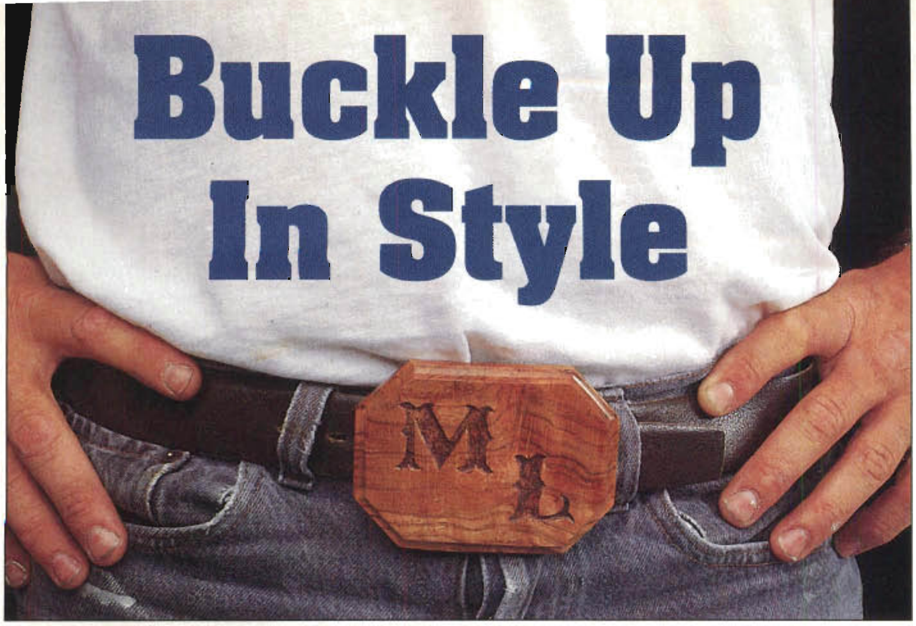
The corners of the upper leg blocks, now the corners of the upper tray, were veneered to cover the screws holding the vertical stretchers. On the interior faces of the upper tray are a crosspiece to stiffen the stand against racking and an extra board along the inner long side. Both of these hold another series of threaded inserts so that the ball feet and the spiral turnings above them can be screwed into travelling position when the stand is disassembled.

It was a treat to put the harpsichord on the completed stand. It took about five weeks to bring the stand to this state. Painting was relatively quick and easy. I used gloss enamel over an enamel undercoat, applying with a French bristle brush some 60mm wide. The deep spirals and changing surfaces made it impossible to thin the paint to the degree it can be thinned when painting lids or other completely horizontal surfaces. Nevertheless, the legs came out with a pretty good finish.

The owner called long–distance to tell me he was arriving for a visit and wanted to know if he could get his instrument back. I told him all was going well. Among other things, the instrument sounded fine for one built in 1670 and battered around since then. I mentioned the stand to him, saying it had spiral legs. He responded, "My God, can you do that?" I answered warmly, "Yes, *now*." **PW**

A Popular Woodworking Project

Buckle Up In Style



by David A. Lepine

Almost all woodworkers, whether professional or hobbyist, often find themselves with a large quantity of scrap wood — end cuts, split and knotted boards and cut outs from scroll and bandsaw work. I can't part with even small pieces of wood, especially distinctively grained or colorful pieces. I've found a creative way to put these small scraps to use while also being quite profitable at craft shows.

Belt buckles made of wood are not only functional, they can be works of art. Once you get the steps down, it's quite simple to produce them. I find the most attractive buckle stock in the burled wood around knots in hardwoods, but tight knots without splits or weak points also make interesting buckles. Avoid soft woods because of the stress placed upon the shallow screws of the metal hardware.

The only power tools you'll need are a belt sander and drill. If you don't own a belt sander, a drum sander attachment about 2" in diameter for your power drill works if you start with pieces 5/8" to 1" thick. If you use larger scraps than that, resaw them — clamp the pieces in a vise and use a hand saw if you don't have large power tools.

Making the Blanks

Begin with a piece of 3/4" stock about 3½" X 2½". I look for the best portion of burled, colorful or twisted woodgrain—the grain can run in any direction—draw a rough square around it, then resaw and square it up to the right dimensions using jointer, table saw and miter saw. You can get similar results with hand tools. Once you have some suitable rectangles, mark the inside curve. A circle 12" in diameter is the proper curve and this can be obtained from a 5–gallon bucket. Trace part of the rim onto cardboard, cut it out and use this arc as a template for your buckle. Mark the curved line on the edge of both long sides of the rectangle. Since the thickness of your wood may vary, leave at least 3/8" at the thinnest point.

Back in the old days before I had all my shop tools and the belt sander was one of my only power tools, I discovered ways to make it a versatile craft aid. If your sander is flat on top you can simply turn it upside down on the edge of your workbench and clamp down the handle with a C–clamp. Other sanders will lay on one side, allowing you to nail a couple of small blocks to your workbench to hold it stationary with the belt extending past the edge of your workbench, turning your belt sander into a bench sander with both flat and curved sanding surfaces (Figure 1).

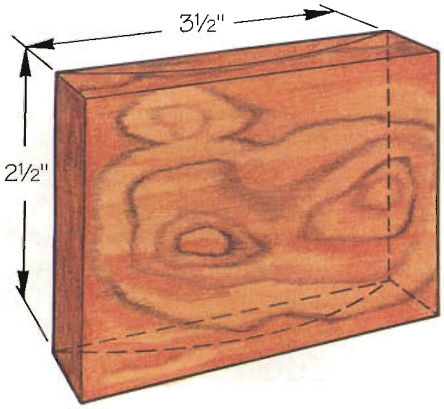
Shaping

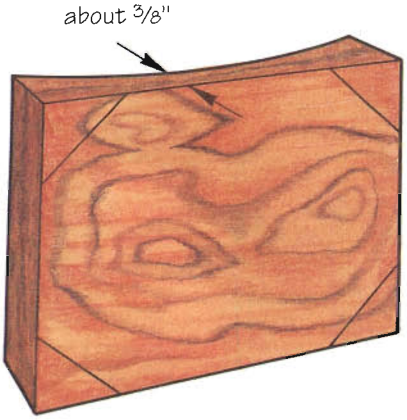
Place the blank on edge and resaw on the band saw along the curved line or use the front wheel on your belt sander (Figure 2). Start with 40–grit and sand with gradual strokes until you achieve the inside curve. Turn the blank upside down every few strokes to maintain an even cut following the lines carefully.

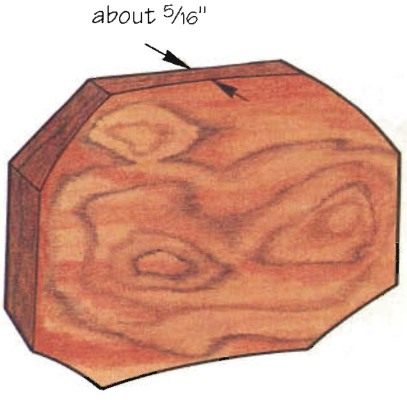
My favorite (and easiest!) buckle shape is an 8–sided figure. A simple method to get an accurate pattern is to mark 3/4" in from each corner and connect the marks with a straightedge. Either resaw and sand, or sand all the way down to achieve the shape desired. You may be thinking it would be better to finish the front before shaping the back curve, but I've found it difficult to get an accurate curve without the full blank to work with. Feel free to experiment—many woodworkers prefer to learn by experience.

Now for some freehand sanding— the reason you may need

David A. Lepine works wood in Huntsville, Texas.







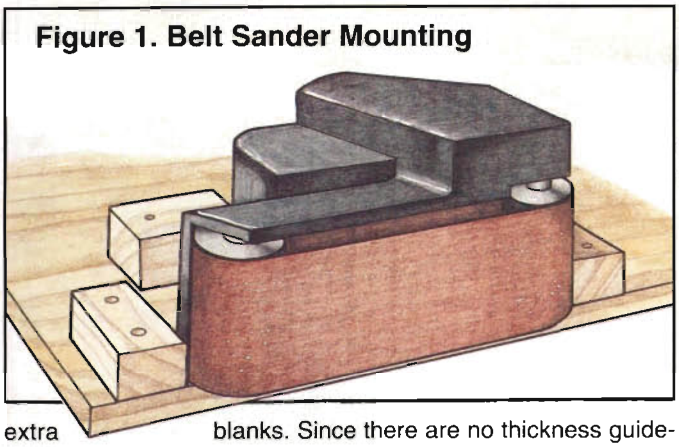


Figure 1. Belt Sander Mounting

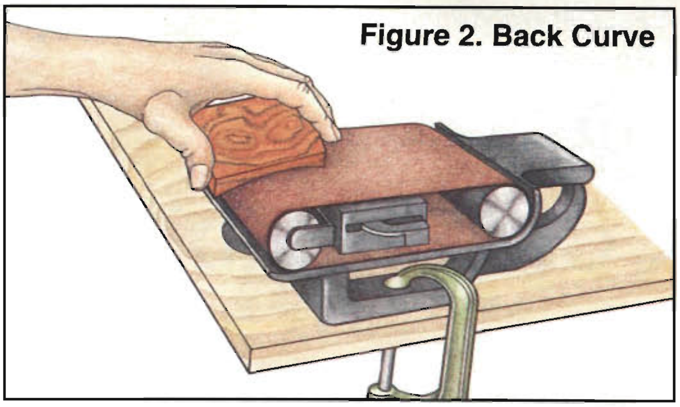


Figure 2. Back Curve

Bob Chapla and Ginny Pruitt

extra blanks. Since there are no thickness guidelines, it is much easier to make a mistake here, so gradually sand the front to match the back curve (Figure 3). Your buckle should be slightly thicker in the center and taper out to the sides. I've trimmed a fingernail or two doing this, so take care.

Now you have a roughed–out buckle. Change sanding grits from 40 to 120, and take out the rough sanding marks on all surfaces, making sure not to change the actual shape of the buckle. Sand slowly or you'll change the curves and angles, resulting in an asymmetrical shape.

Change to 240–grit sandpaper and sand the buckle down by hand. Decide if you want the wood to be the finished decoration or if you want to carve, paint, stain or personalize the buckle. Consider trying some inlay or marquetry.

Carving

One of my best selling designs is the carved shape of a state. I use a power carver, but knives and chisels work just fine. Get a picture of a state and reduce it on a copy machine, draw a circle around it with a compass and cut out the circle. Glue it to the center of the blank, carve the outlines of the circle and the state with a very small bit and remove the waste between them.

Other popular designs are initials or names. Use the letters in the PullOut™ Plans or use whatever alphabet strikes your fancy. One method is to carve the letters into the blank, then apply dark stain or gold paint to the carved–out areas. Let it dry, then finish sanding. A border cut with a sander or power carver really dresses up your buckle. You can use a large ball bit on your power carver to get a cove around the edge or round over the edge with your belt sander. As you can see, the creative possibilities are endless. I finish the buckles with tung oil varnish and wax because they take a lot of heavy wear. Oil finishes are glossy, durable and easy to touch up with more oil and some furniture polish.

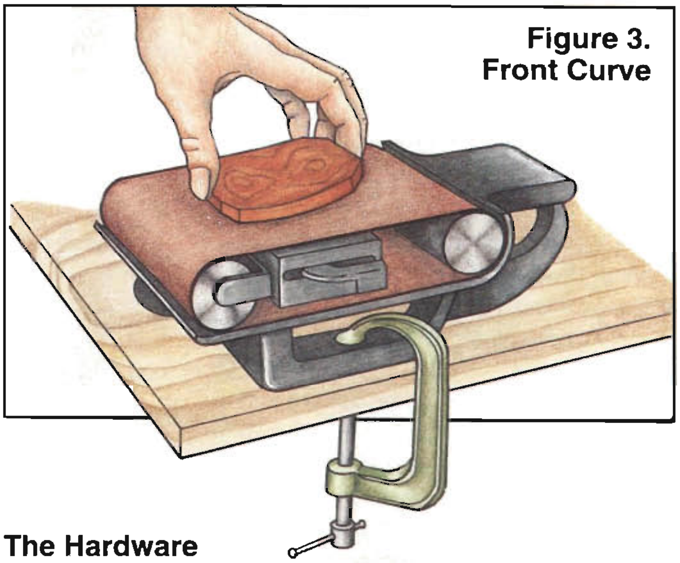


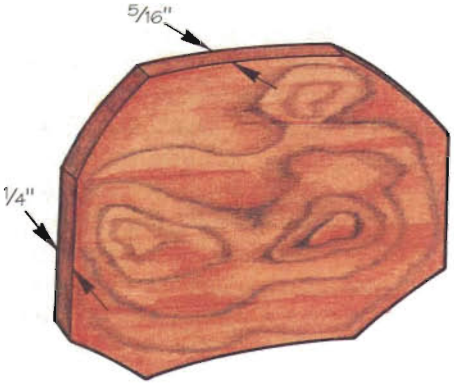
Figure 3. Front Curve

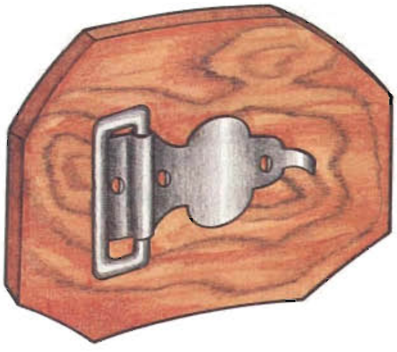
The Hardware

Stores that deal in leather craft supplies carry metal belt buckle hardware that is inexpensive and comes in several sizes. While you're at the leather store, check out the leather tooling templates—some make great woodcarving patterns.

Put a slight bend in the hardware to match the buckle curve. Lay the metal piece in place at the center back of the buckle, mark the center hole and drill a shallow starter hole for a wood screw. Find a wood screw with the widest thread that will fit so it gets a good grip. Drill out the holes in the metal back piece to allow for a bigger screw or shorten long screws to fit thinner buckles. Be careful not to drill through your buckle. After setting the center screw, align the back piece and attach the other screws.

Now you have a valuable piece of craft work—considering your overhead—a great personalized gift and a scrapwood craft show item that sells well. PW

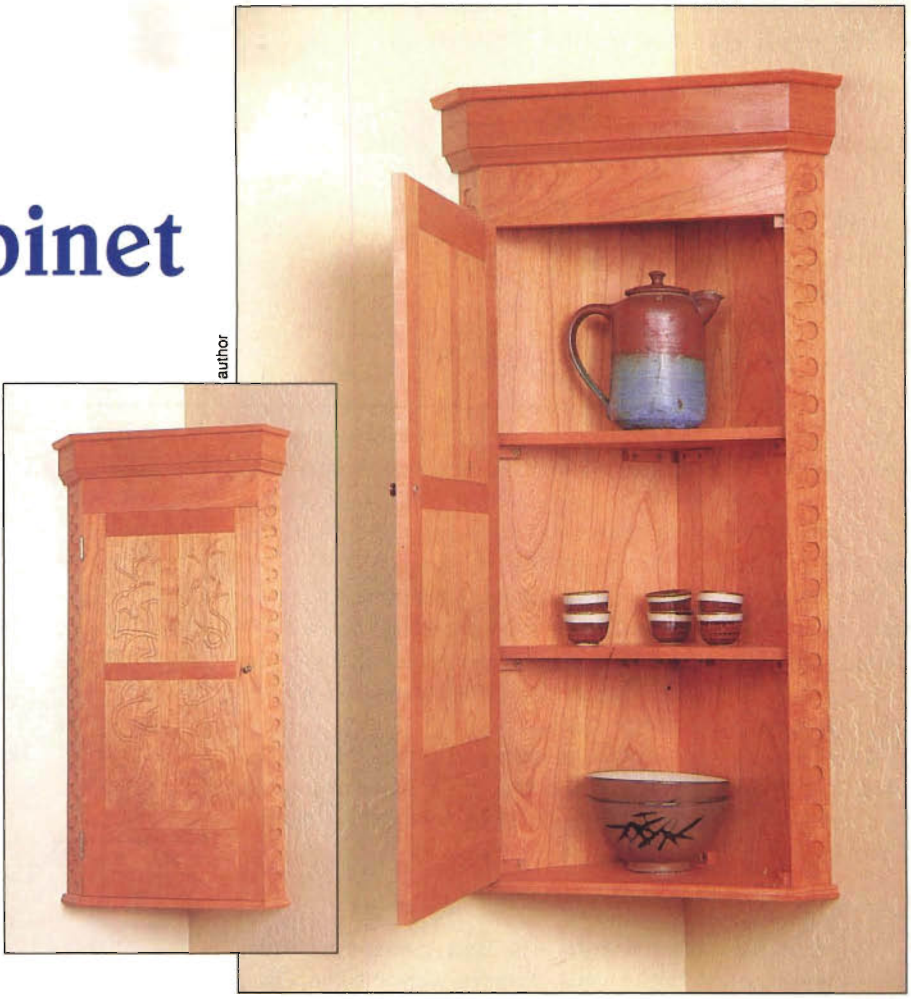




Elizabeth Vanderliet

A Popular Woodworking Project

Carved Corner Cabinet


author

by Jeff Greef

This small, wall-mounted corner cabinet is handy for storing cups and saucers or glasses in a room where space is at a premium. The basic method of construction is not complex or time consuming; it frees you up for the fun part of the project—carving. The vertical "S" curve pattern on either side of the door is running relief carving. The outline of the vine and grooves in the door is made with a V-parting tool following the design provided in the PullOut™ Plans.

Glue up the panels for the back (A and B), the top and bottom (C) and the two shelves (D). Make the panels slightly larger than the finished dimensions given in the Cutting List. The top, bottom and shelves are triangles—cut them from one 12 1/2" X 36" panel.

The Door

Make the door before you carve the panels. The door is frame and panel construction. The solid panels are held in grooves cut in the stiles and rails. The frame joinery is mortise and tenon and is done entirely on your table saw. Cut 3/16" X 3/8" deep dadoes on the inside edge of both stiles (E), the top and bottom rails (F) and both edges of the midrails (G) and mullions (H). Don't change your table saw blade—make two passes. Set the blade 5/32" from the fence, make one cut, then reverse the part and cut again.

Set the fence 3/8" from the outside edge of the blade and raise the blade to 1/8". Put your miter gauge in place, and attach an extension to its fence. Make a series of test cuts on a piece of 1/2" scrap. With the blade 1/8" high, the resulting tenon is too thick. Raise the blade a hair, and cut; then test fit. Continue until the tenon is a snug fit in the groove. Cut the tenons on the rails and mullions. Glue the door in two stages with C-clamps to ensure a good bond without the panels getting in the way. Glue the mullions to the rails, leave off the bottom rail and center the pieces carefully.

When the glue is set, dry assemble the door with all the frame parts, and measure the size of each panel opening. The panels should fit perfectly in the openings so the door appears as a flat surface without any gaps. Remember that you need to leave room for the panels to expand and contract. Subtract 1/32" from the opening size along the panel width, and 1/64" along the length to determine the size of each panel face.

Cut the panels (I) to the dimensions given in the Cutting List, then calculate the width of the tongue based on the dimensions needed for the face. Cut the tongues on the table saw with the blade set at 11/32" from the fence, and use a dado. Use a test piece and adjust the fence to get a snug fit of the tongue in the groove. Clamp a 2 X 4 to the table as a guard, and use firm pressure against the fence.

Adjust the height of the blade to 1/4". This adjustment determines the final fit of the panel shoulders in the door frame and is what you see on the finished door. Lower the blade a hair, make a cut, then dry fit the panel to see how it lines up. Raise the blade and take off more if necessary. Put the panels in their grooves and glue the rails to the stiles. Pull the stiles together gently with bar clamps, and apply C-clamps with blocks to bring the groove walls in solid contact with the tenons. Once the C-clamps are in place, remove the bar clamps.

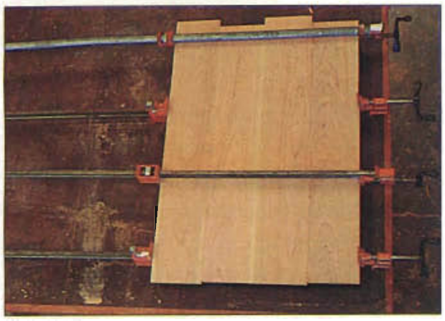
Carving

While the door is drying, begin the carving on the front side pieces (J). Rip them to width, and cut to length. Before you lay out the "S" pattern of this design, you need to know what chisel you'll use—the pattern depends on the diameter of the half circle cut by the gouge. For example, a #8 X 5/8" gouge has a 3/4" diameter.

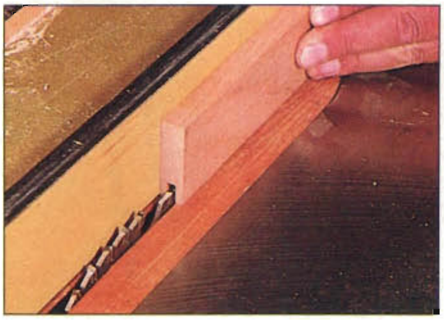
Mark the spaces between the half-circles and scribe two longitudinal lines 1/2" from each edge. Begin by cutting half-circles to a depth of 1/16" within the scribe

(continued on page 34).

Jeff Greef works wood and writes wood-related journalism in Santa Cruz, California.

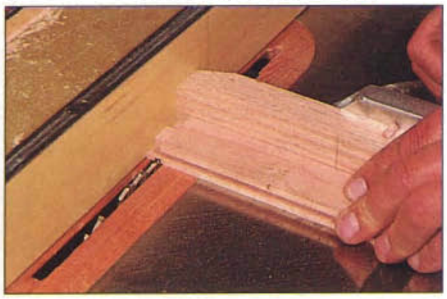


When you glue up the panels, make them larger than the Cutting List dimensions.

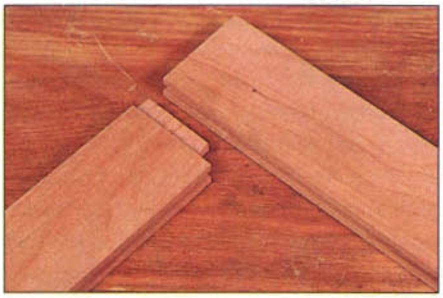


Set the fence to cut the door frame grooves in two passes.

Lower the blade and set the fence to cut the tenons on the rails and mullions.



For a perfect joint, make several test cuts and adjust the saw blade as needed.

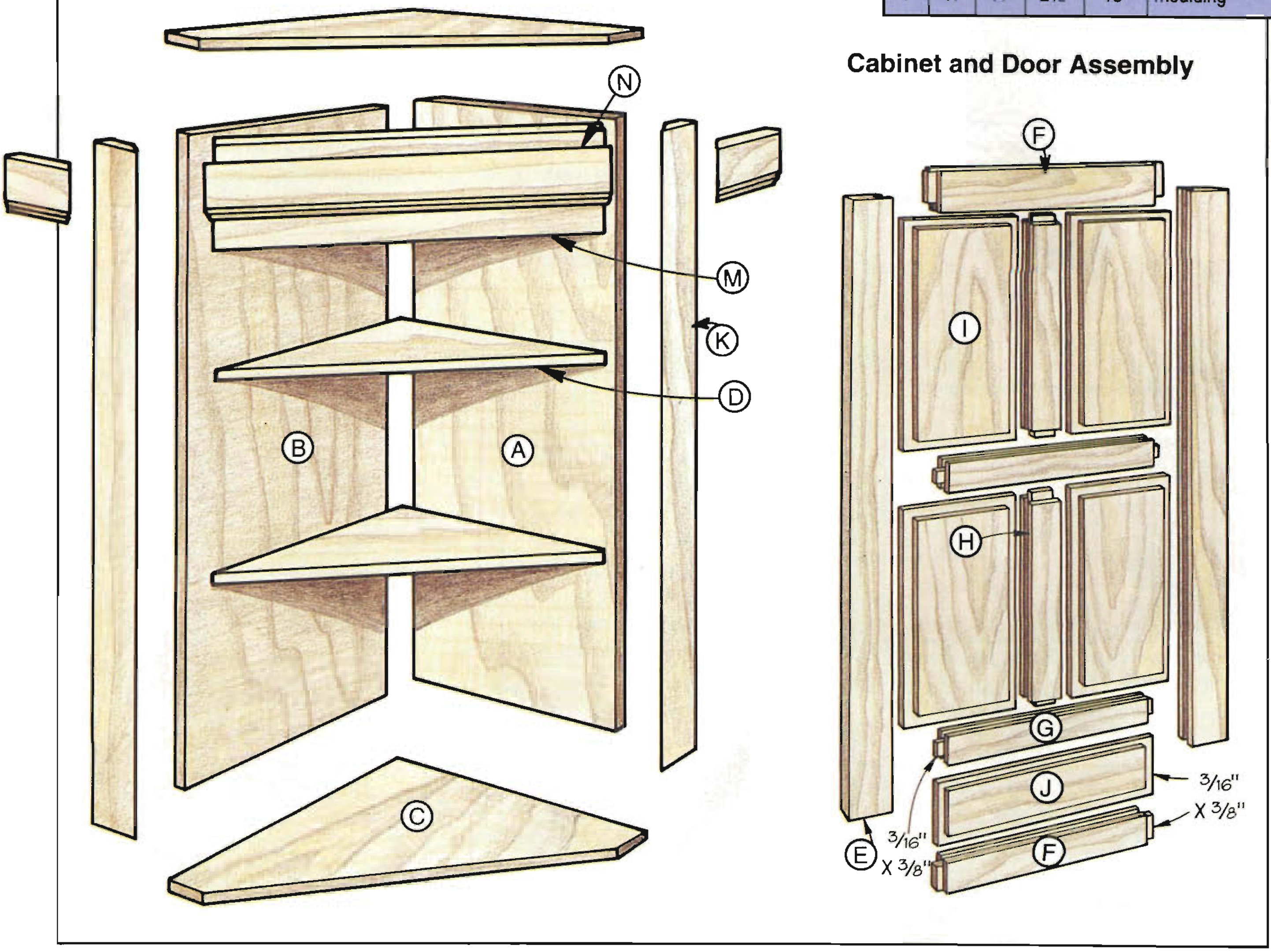


Carved Corner Cabinet

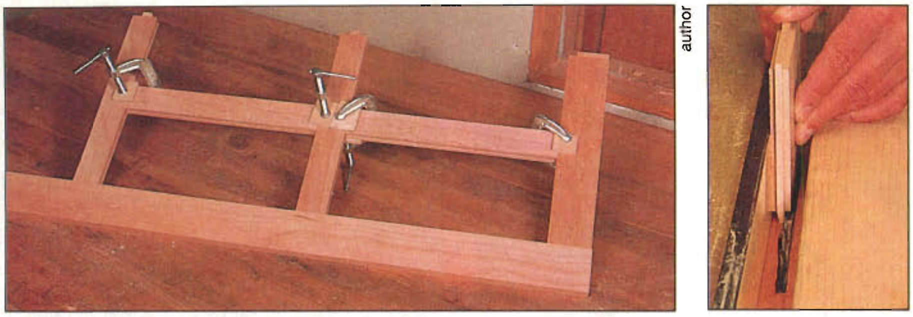
Cutting List

		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
1	A	½"	10½"	32"	back
1	B	½"	10"	32"	back
2	C	½"	14"	14"	top & bottom
2	D	½"	12½"	12½"	shelves
2	E	½"	1¾"	27"	stiles
2	F	½"	1¾"	9¾"	top & bottom rails
2	G	½"	1¼"	9¾"	midrails
2	H	½"	1¼"	9¾"	mullions
4	I	½"	4⅜"	9½"	panels
1	J	½"	3½"	9½"	bottom panel
2	K	½"	2	32"	front stiles
16	L	½"	½"	2"	screw blocks
1	M	½"	5	12½"	face frame rail
1	N	¾"	2½"	18"	moulding

Bob Chapla and Ginny Pruitt

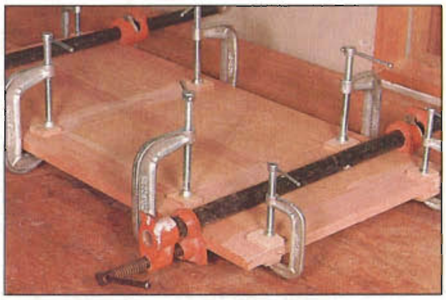


Cabinet and Door Assembly

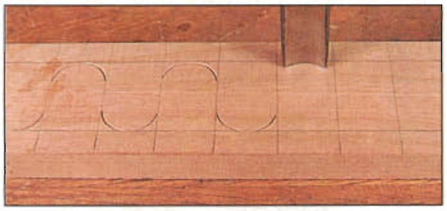


author

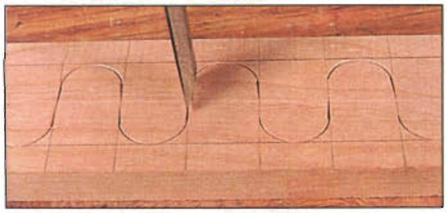
Glue up the door, leaving off the bottom rail and aligning the pieces carefully. Cut the tongues in the panels next.



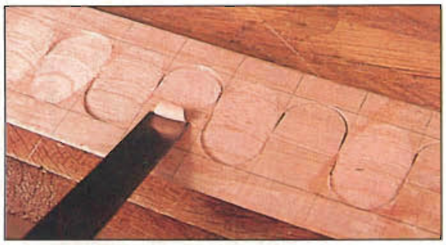
Use C–clamps to help keep the door frame pieces flat and flush.



Begin the carving on the front side pieces with a gouge radius of your choice.



Connect the half–circles with a straight chisel.



Use a shallow gouge to finish the sloped running carving.

marks. Make this series of cuts on both pieces before you proceed with clearing out the waste in each half circle. It is more efficient and takes less time if you don't switch from tool to tool at each half–circle. Methodical carving with a repeating design is called ***running carving***.

Once the half circles are cut, use a regular bench chisel to connect their ends. Angle the depth of the cut toward the half circle to follow the angle of the final surface. Point the bevel of the chisel toward the waste—the flat of the chisel leaves a cleaner edge.

Finally, use a gouge with a very shallow arc to remove the waste material inside the half–circles and between the bench chisel cuts. A #3 X 1/2" gouge works well. Make sure the chisel is sharp since you are cutting across the grain and want the finished surface to be smooth. Slope the cut down toward the half–circle, and dish it out following the radius of the gouge you use.

Remove the door from the clamps when the glue is dry, and trace the design from the PullOut™ Plans onto it. Transfer the design to the top panels (I) only, not to the frame or bottom panel (J). To avoid chipping the edges as you carve, keep the design 1/4" from the edge of the panels. Sketch your own design if you find the inspiration. Use a #12 or #15 V–parting tool to outline the vines. Again, sharpen the tool well. As you cut directly across the grain, a dull tool pushes and crushes the fibers. Work slowly and coax the tool through the wood. Forcing it will cause you to slip and gouge beyond the pattern.

With the outline finished, cut the parallel grooves between the vines to provide the textured background. Again, go carefully or the tool will slip and cut through a vine. I confess this happened to me once or twice (okay—three times) but it was easily repaired by gluing in a small chip that fit well. The grooves follow the wood grain—the grooves between the vines are vertical and those on the bottom panel are horizontal.

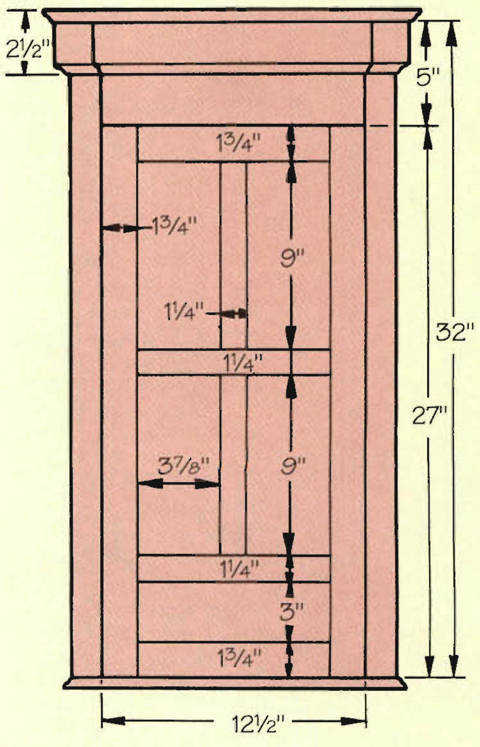
Assembly

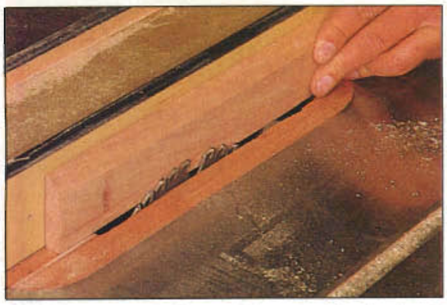
Cut the 45° angle on the inside edge of the two stiles (K) on your jointer or table saw. Cut the two back pieces (A and B) to length and rip to width. Make a 1/2" X 1/32" deep rabbet in the side pieces and in the back (A) where the pieces butt together. This helps you locate the joint during assembly—slippery glue makes the parts shift around. Avoid burning the wood in the rabbet; it leaves a weak, non-porous glue joint. Glue and nail the two backs. If you made your cabinet of hardwood, predrill holes for the nails to prevent splitting. Glue and clamp the front stiles to the backs. Use clamping strips between the clamps and

When the door is dry, outline the vine pattern with a V–parting tool.

Texture the background using the V–parting tool along the grain.

Front View



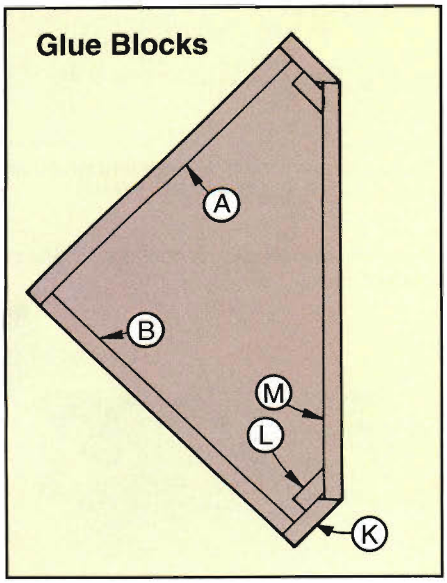


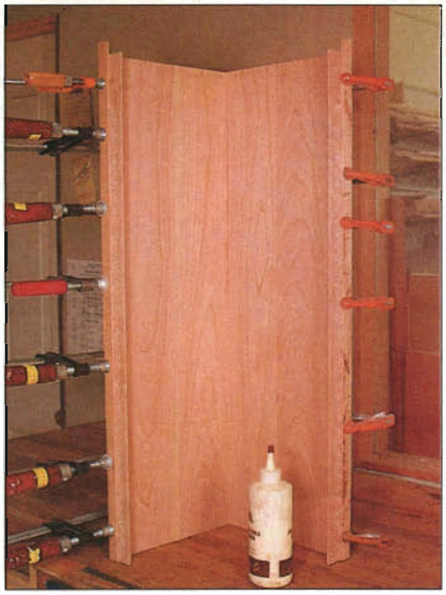
Make a very shallow rabbet on the back of the front stile to help you locate the joint.

the stiles to prevent damaging the carved surfaces.

Make sixteen screw blocks (L) to the dimensions given in the Cutting List to secure the top, bottom, and shelves, placing the shelves where desired. Drill two countersunk screw holes through one face of each block. Place them individually into position, mark the location of each screw hole with a pencil, and drill each hole. When all the holes are drilled, screw down the blocks.

The face frame rail (M) above the door is glued to two modified blocks that are attached to the front stiles as shown below. Cut the 45° angle in the blocks and glue them on the front side pieces. Use the frame rail as a guide to locate the blocks, clamp them in place, then remove the rail. When the blocks are dry, glue in the rail. Since there aren't any good surfaces for clamping and you can't get in from behind with screw, you'll need to use a band clamp. Place a piece of scrap over the face frame rail; the pressure from the band is applied on the front plate and not the inner edge of the side pieces.



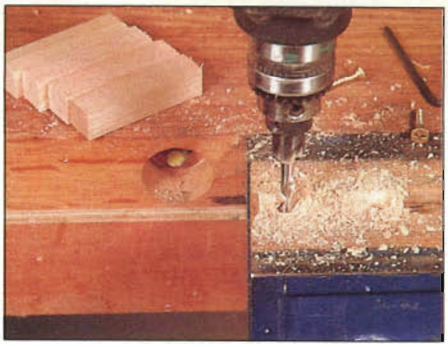


Glue the front stiles to the backs with clamping strips so you don't damage the carving.

Make the moulding (N) for the top and rout the bottom edge with a pattern you like. Cut the $22\frac{1}{2}$° miters to fit and glue the moulding in place. Determine the size of the top and bottom (C), by placing the cabinet on the panel. Trace the outer edge of the cabinet onto the stock, and add $\frac{1}{2}$" to the leading edges. Measure the size of the shelves, and trace them as well. Cut out the top, bottom and shelves with a band saw. Clean up this edge, and rout an ogee or other decorative pattern into the exposed edges of the top and bottom panels.

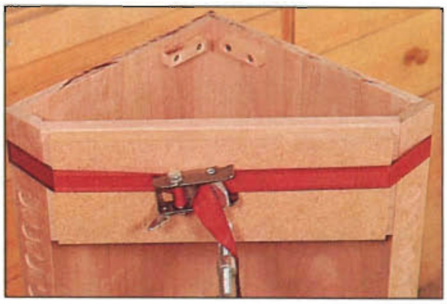
Clamp the top and bottom in place, drill holes through the screw blocks and install screws. Make and install two small stops for the door to prevent it from closing too far inward. Cut mortises in the door and front stiles for your hinges. Angle the screws so that they penetrate the face. The angled screw heads stick up a bit, so use hinges that have a fair distance between leaves when closed. I used ball tip pin hinges from The Woodworker's Store (part #25668, 21801 Industrial Blvd., Rogers, MN 55374–9514 Tel. 612-428-2199). Install the knob and catch you prefer.

Use a good quality finish for an ornate cabinet such as this. I used orange shellac —a one–pound cut with three or four coats. The orange hue it leaves goes nicely with the cherry. Varnish is easier to use than shellac and is also a good choice. Use thin coats so that the finish does not puddle in the carvings. Sand lightly between coats and polish the last coat with extra fine steel wool. Apply a coat of finishing wax.

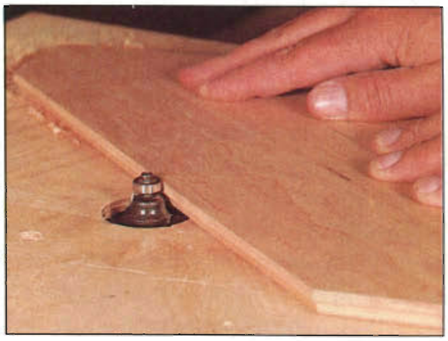


Drill the countersunk holes in each screw block (L).

Position the screw blocks to support the shelves where you want them.

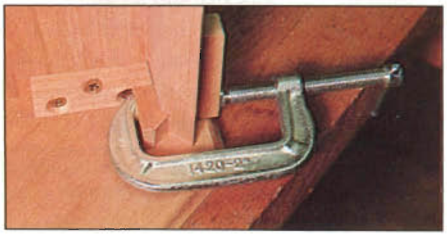


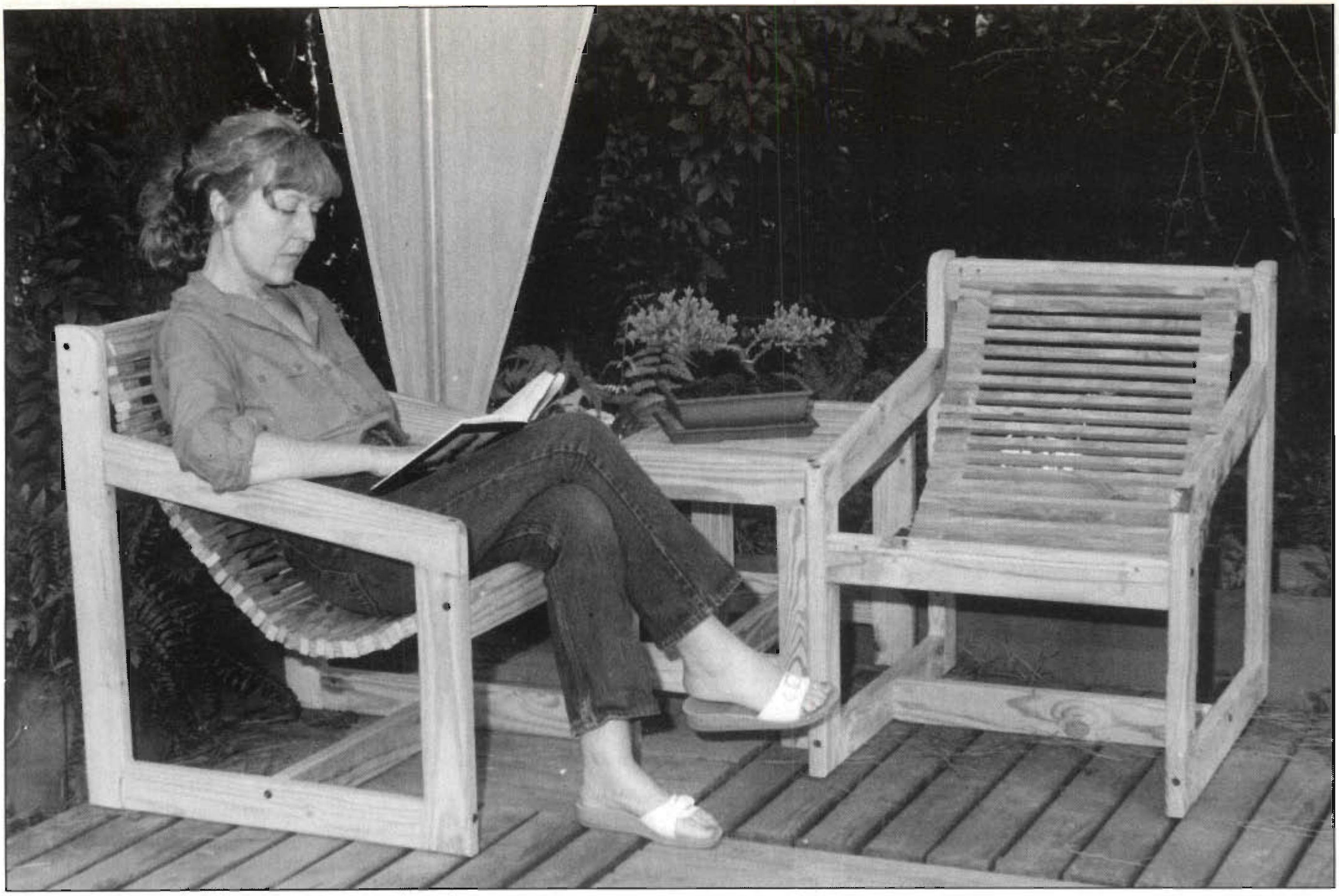
Here is a perfect use for the band clamp. The angled surfaces would ordinarily be almost impossible to clamp.



Rout the decorative edge pattern into the top and bottom.

Place blocks just inside the cabinet so that the door doesn't close inward too far.





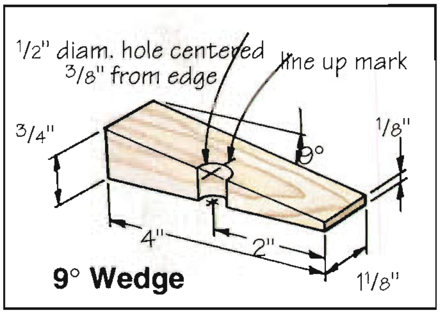
Outdoor Furniture You Can Live With

by Tom Crabb

Outdoor furniture should be four things: comfortable, low maintenance, solid enough to stay where you put it, and last a long time. That's exactly why I made this furniture. Any durable combination of chairs, settee and tables can make a living room out of a corner of your yard. You can leave them outside and the next thunderstorm won't blow them over to your neighbors. Sun, rain, and snow will only mellow the wood, not peel the paint or loosen the joints.

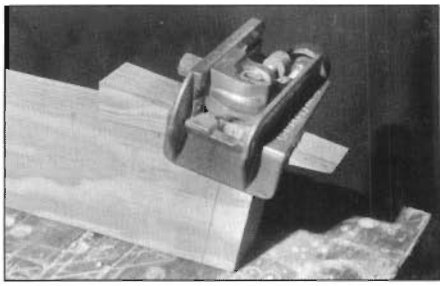
[Editors Note: This project recomends the use of pressure treated lumber to increase the durability of the finished furniture. The dust from cutting and sanding is known to be toxic. Exercise caution and wear a protective breathing apparatus when working with this material.]

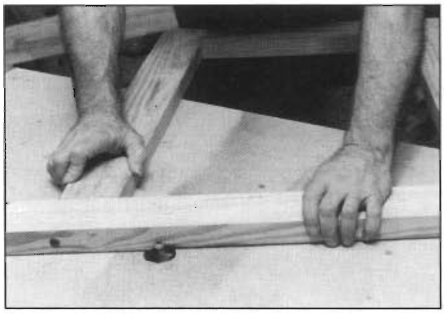
***Tom Crabb** is the author of several books on woodworking including* Making Wooden Boxes with a Band Saw *(Sterling).*



For the angled holes, glue the 9° wedge to your doweling jig with contact cement.

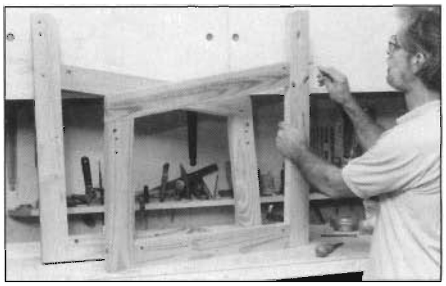
When the alignment is set, transfer the mark from the work to the wedge.

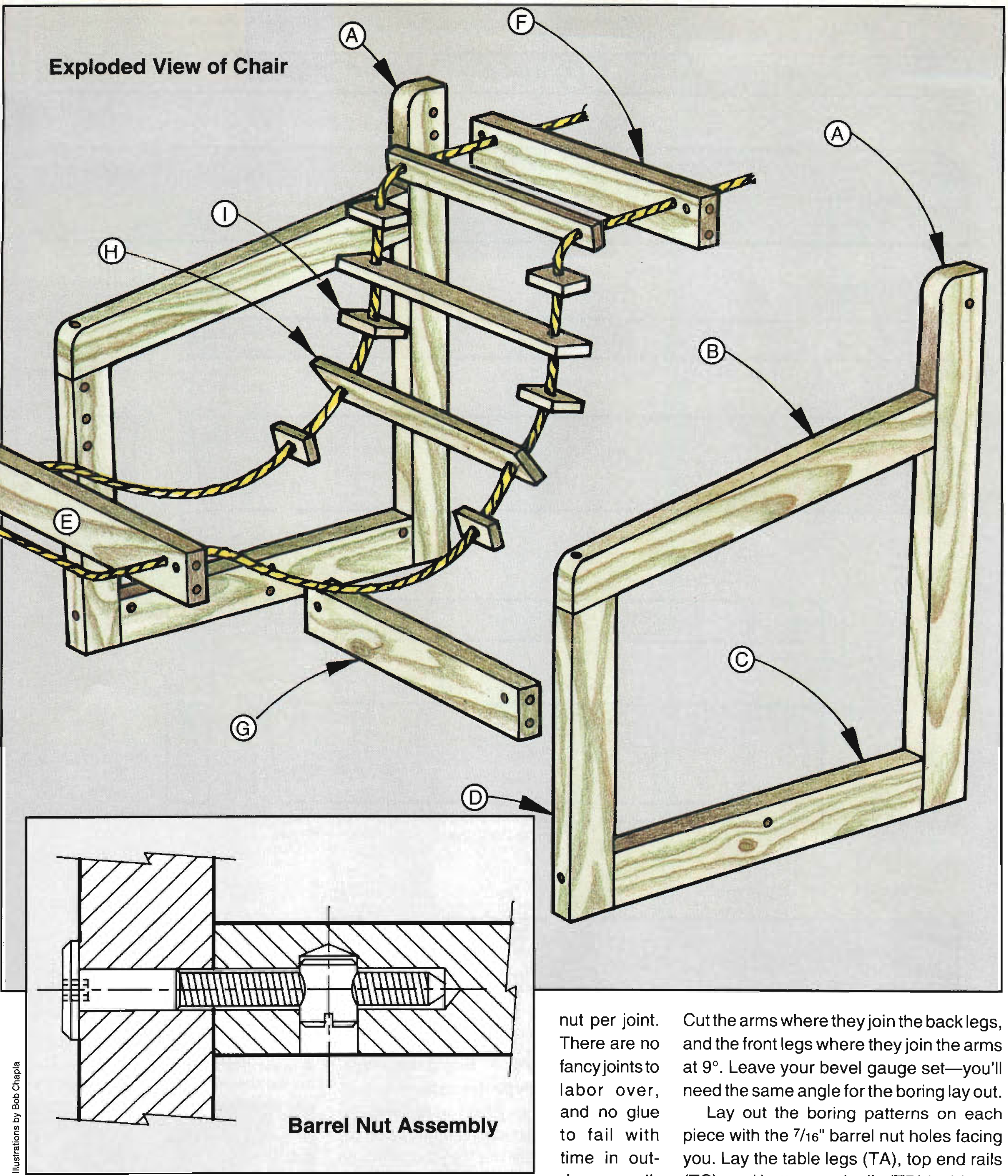




Route a $3/8$" radius on the chair end sections. A router in hand will also do the job.

Assemble the left and right end sections of chair or settee.





Exploded View of Chair

Barrel Nut Assembly

Illustrations by Bob Chapla

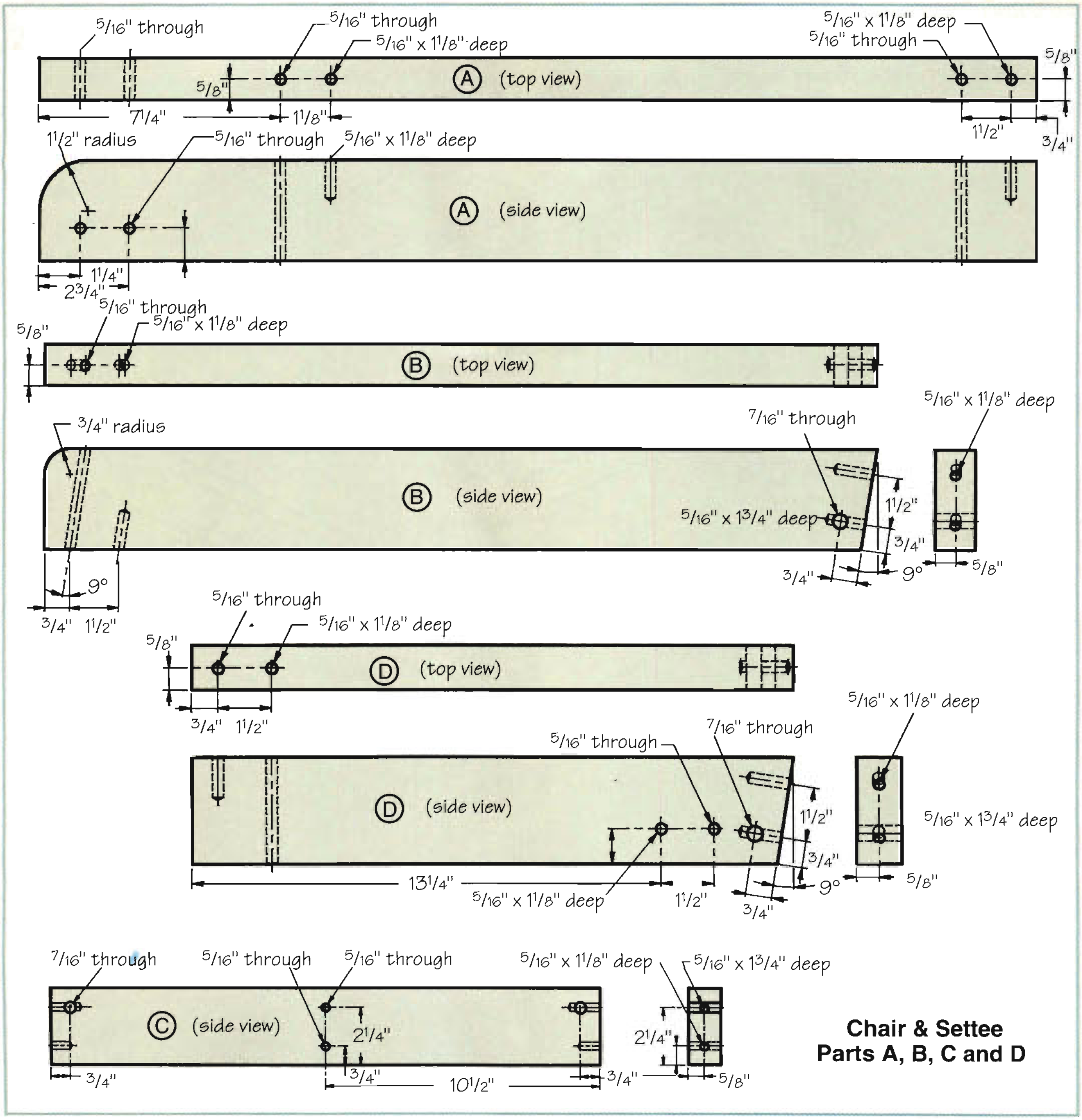
The chair and table begin as treated yellow pine 2 X 4's planed to 1¼", one edge joined, then ripped to 3" wide. This gives the parallel surfaces and square, straight edges necessary to lay out the boring patterns accurately.

The basic construction is one alignment dowel with one bolt and one barrel nut per joint. There are no fancy joints to labor over, and no glue to fail with time in outdoor conditions. There are a lot of holes to bore.

Cut all the 1¼" X 3" material to the lengths given in the Cutting List and lay out the end pieces so the inside of the sections face you. For the chair or settee, place the back legs (A) edge to edge with the arms (B) and end rails (C) laying out to the left and right and the front legs (D) at the ends. Cut the arms where they join the back legs, and the front legs where they join the arms at 9°. Leave your bevel gauge set—you'll need the same angle for the boring lay out.

Lay out the boring patterns on each piece with the 7/16" barrel nut holes facing you. Lay the table legs (TA), top end rails (TC), and bottom end rails (TD) inside up. This insures that you have left and right end sections and you can check the accuracy of the holes you'll bore at the same time. Mark and cut the radiused edges on the arms and back legs at this time.

Do all the straight boring first with a doweling jig and 5/16" sleeve. Mark the bit with masking tape for the different depth of

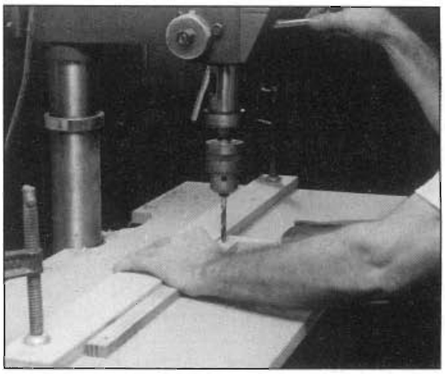


Chair & Settee
Parts A, B, C and D

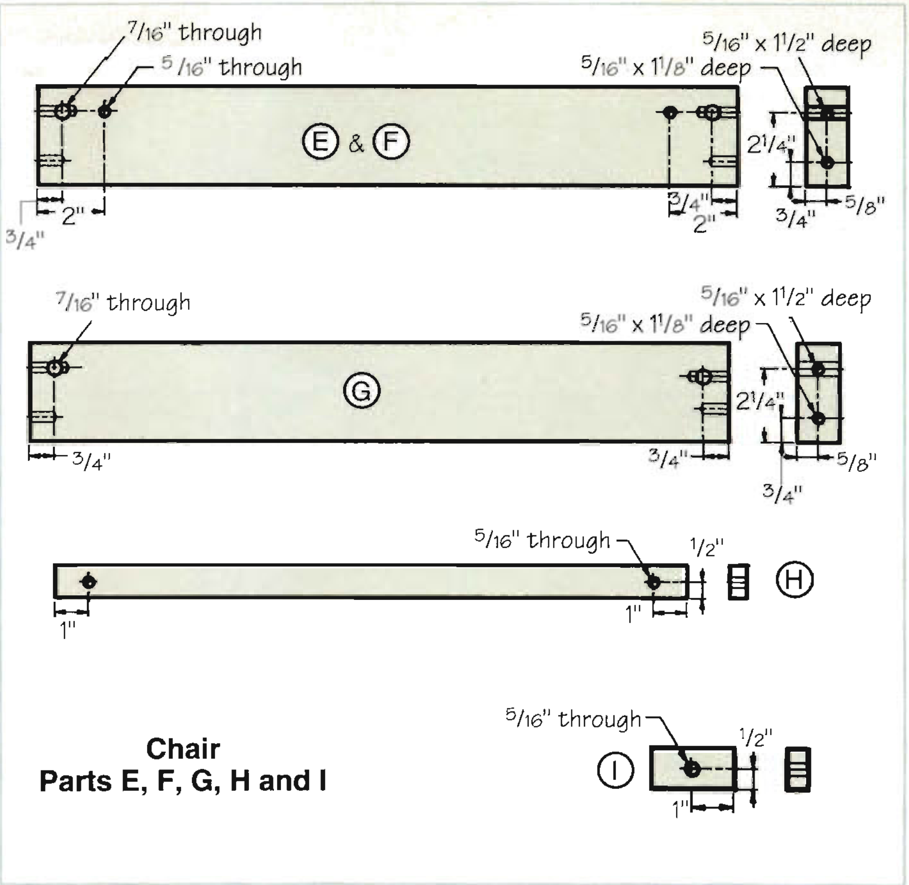
holes. After the straight holes are drilled, set up the doweling jig to bore the angled holes in the arms and the legs. Make the 9° wedge and glue the tapered side to your doweling jig so the hole straddles the alignment mark on the jig as in the photo and detail figure on page 36. Use contact cement and the wedge can be removed with a little lacquer thinner. Set the jig on the work piece and eye–ball the alignment. Drill a 5/16" diameter hole through the wedge and let the tip of the bit just mark the work piece. Remove the jig and check the marks. When they are exactly aligned, transfer the mark from the work piece to the wedge. Drill all of the angled holes so the hole runs parallel to the edge of the work piece.

The face grain boring comes next. On the drill press, bore the 5/16" diameter bolt and dowel holes, then bore the 7/16" diameter barrel nut holes. Make the depth of the barrel nut holes so the bottom of the hole stops the nut with the threads aligned in the center of the bolt hole. Barrel nuts come in several lengths so know what you're going to use before drilling the holes. Any 1/4" X 20 bolt will work with the barrel nuts, however, low–profile hex drive bolts

A fence and stop on the drill press makes boring the slats and spacers much faster.


author

Outdoor Chair					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
2	A	1¼"	3"	30"	back legs
2	B	1¼"	3"	25"	arms
2	C	1¼"	3"	21"	end rails
2	D	1¼"	3"	17"	front legs
1	E	1¼"	3"	21"	front rail
1	F	1¼"	3"	21"	back rail
1	G	1¼"	3"	21"	stretcher
30	H	½"	1"	19"	slats
58	I	½"	1"	2"	spacers
Supplies					
8	4¾" ¼" X 20 bolt				
6	2¾" ¼" X 20 bolt				
14	¼" barrel nuts				
14	5/16" diam. X 2" dowel pins				
10' x ¼" polypropylene rope					

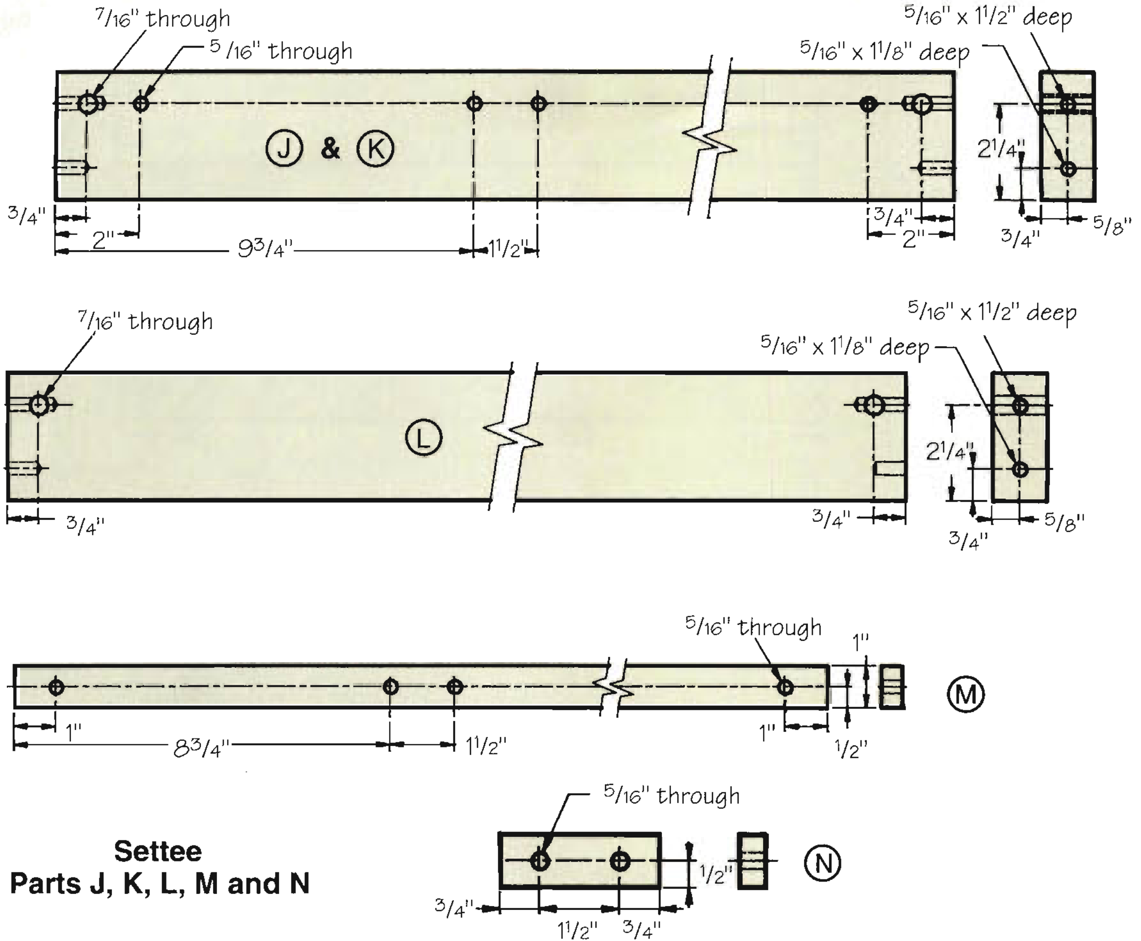

Chair Parts E, F, G, H and I

Stack the slats and spacers onto the front rail of the chair.

have a tapered lead on the thread end to help align the bolt with the barrel nut. After the intersecting holes are bored, clear out the wood chips.

When all the boring is done, assemble the end sections. I always drive the alignment dowels in the horizontal members, that way I don't forget any. Attach the end rail to the front leg first, then the arm to the top of the front leg, lastly add the back leg. The dowels hold the assembly together while you put the barrel nuts and bolts in

After sitting in the chair a few times, you may need to adjust the seat. Either loosen the rope a little, or remove a slat and its spacers. Then, take up the slack in the rope to re–tighten.



Settee
Parts J, K, L, M and N

place. Assemble the table by connecting the legs (TA) to the lower end rail (TD), then place the upper end rail (TC) on top of the legs.

When the end sections are assembled, rout a 3/8" roundover on all the edges. Radius the front and back rails and the stretchers before any further assembly. Rout the table's top rails after the top is assembled.

With the end sections complete, it's time to cut the chair slats from 5/4 X 6 decking—1 1/8" X 5 1/2". Cut the board into 19" pieces for the chair (44" for the settee), join one edge and rip into 1/2" strips. A board typically yields eight strips. Rip enough extra strips to make 58 spacers for the *chair*—87 (58 + 29) for the settee. Boring the slats and the spacers takes less time than you think. A fence and stop clamped to your drill press makes the job fast and accurate—use the same set-up to bore the spacers.

Next, assemble each end section to the back rail and the stretcher. Prepare the polypropylene rope in one of two ways. Tape the ends in a point with masking tape or heat one end at a time in a small flame until soft. Then roll a point on a metal surface. Be careful—when this stuff gets hot it's very hot, and not only that, it sticks to your skin. If you try to rub it off you only spread the agony. Push the ends through the two holes in the front rail (E). For the settee, cut the 20' piece of rope in half. Then take one rope and put the ends through the left and left–center hole of the front rail—the other one goes through the right and right–center holes. Adjust the rope(s) so they're equal in length on each side. Slip one slat and one spacer on each end. Don't forget the larger middle spacers on the settee. Keep stacking slats and spacers until all 30 slats are in place.

Attach the front rail to the chair and push the two ends of the rope through the holes in the back rail. Pull everything as tightly as possible to the back rail. Once it's tight, you can let go of one end to tie the other without losing much ground. After sitting in the chair, you can adjust the seat by slackening the rope a little or taking out

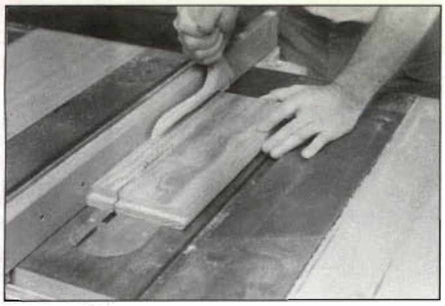
Outdoor Settee

Cutting List

Qty	Part	Finished Size T	W	L	Piece
2	A	1¼"	3"	30"	back legs
2	B	1¼"	3"	25"	arms
2	C	1¼"	3"	21"	end rails
2	D	1¼"	3"	17"	front legs
1	J	1¼"	3"	44"	front rail
1	K	1¼"	3"	44"	back rail
1	L	1¼"	3"	44"	stretcher
30	M	½"	1"	42"	slats
29	N	½"	1"	3"	mid spacers
58	I	½"	1"	2"	spacers

Supplies

8	4¾" ¼" X 20 bolt
6	2¾" ¼" X 20 bolt
14	¼" barrel nuts
14	5/16" diam. x 2" dowel pins
20' x ¼" polypropylene rope	



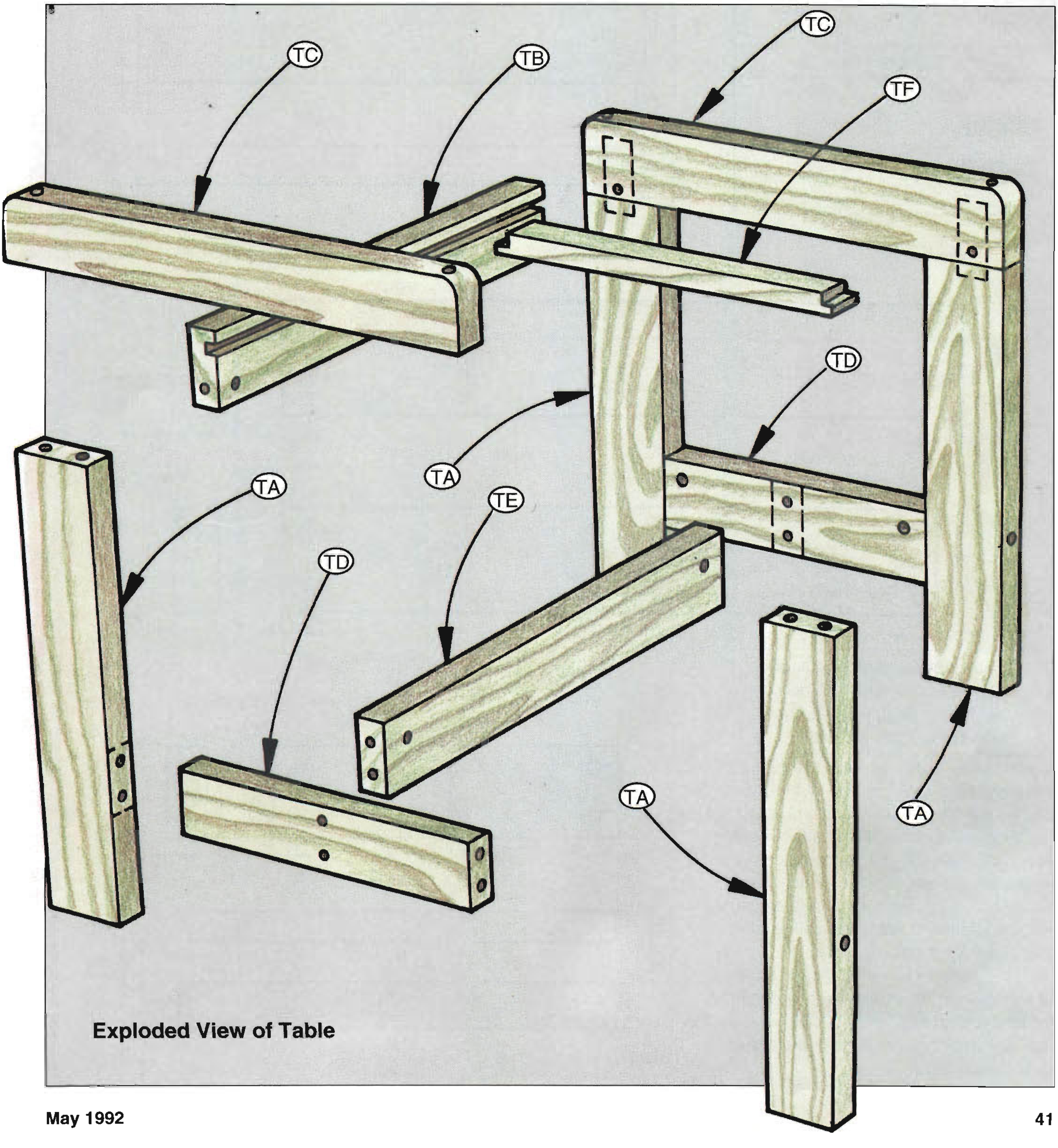
After cutting the rabbet in each end of the 19" piece of 5/4 decking, rip it into 1 1/2" strips for the table top (TF) slats.

To assemble the table top, clamp the slats in place then screw each end of the slats to the rails with a #8 x 1" flat head screw.

a spacer and pulling it a little tighter. Once the seat is where you like it, cut the rope a couple of inches from the knot and seal the ends.

Cut the dadoes in the front and back rails (TB) for the table. Cut the table top slats (TF) from 5/4 decking ripped 1 1/2" wide. First, cut the decking to length, join one edge, and cut the rabbet. Rip to width. This insures all the slats are the same. Six inch wide decking yields 4 slats.

To assemble the top, clamp all the slats



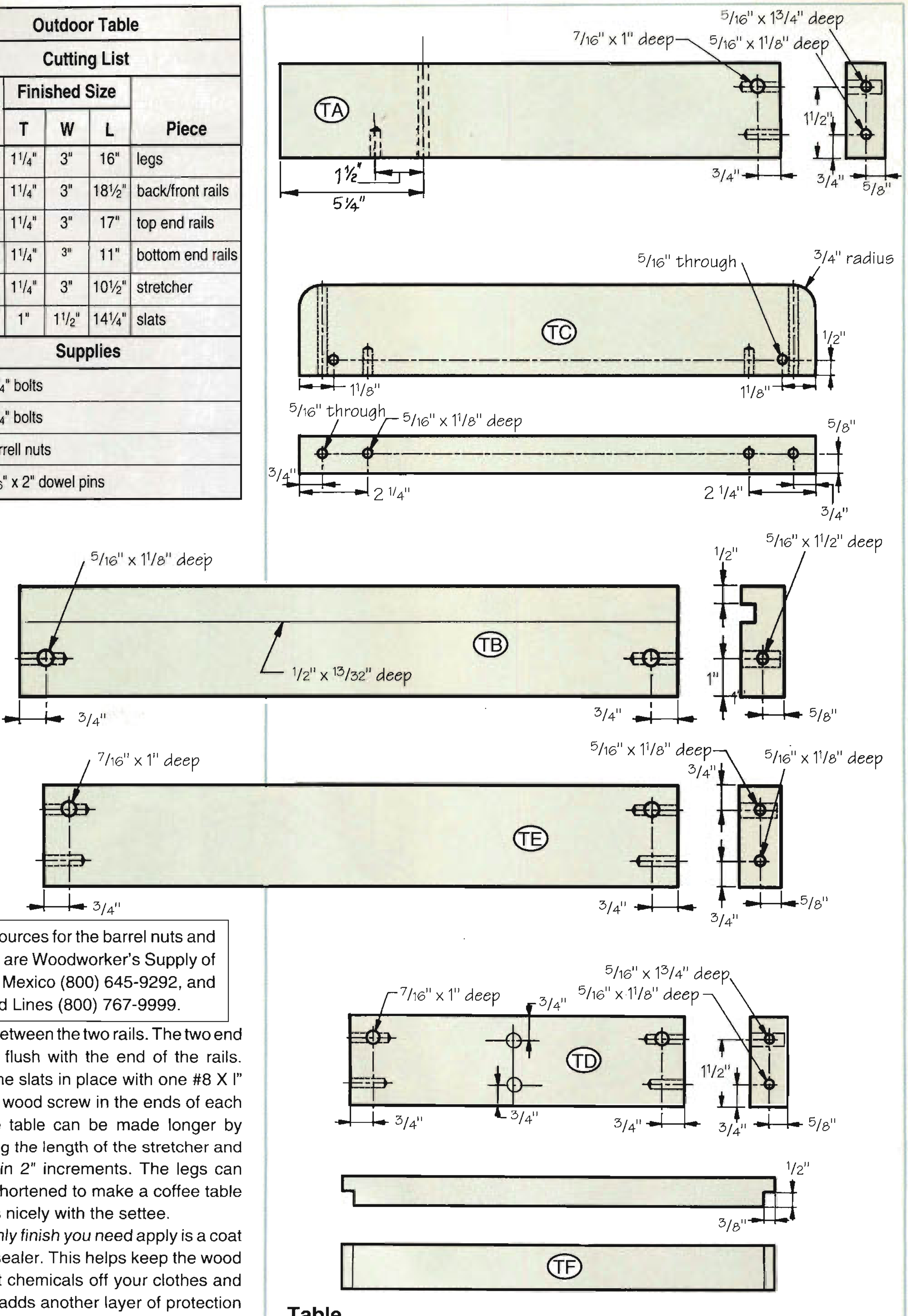
Exploded View of Table

Outdoor Table					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
4	TA	1¼"	3"	16"	legs
2	TB	1¼"	3"	18½"	back/front rails
2	TC	1¼"	3"	17"	top end rails
2	TD	1¼"	3"	11"	bottom end rails
1	TE	1¼"	3"	10½"	stretcher
9	TF	1"	1½"	14¼"	slats
Supplies					
8	4¾" bolts				
6	2¾" bolts				
14	barrell nuts				
14	5/16" x 2" dowel pins				

Sources for the barrel nuts and bolts are Woodworker's Supply of New Mexico (800) 645-9292, and Trend Lines (800) 767-9999.

in place between the two rails. The two end slats are flush with the end of the rails. Secure the slats in place with one #8 X l" flat head wood screw in the ends of each slat. The table can be made longer by increasing the length of the stretcher and top rails in 2" increments. The legs can also be shortened to make a coffee table that goes nicely with the settee.

The only finish you need apply is a coat of wood sealer. This helps keep the wood treatment chemicals off your clothes and skin and adds another layer of protection to the wood. PW



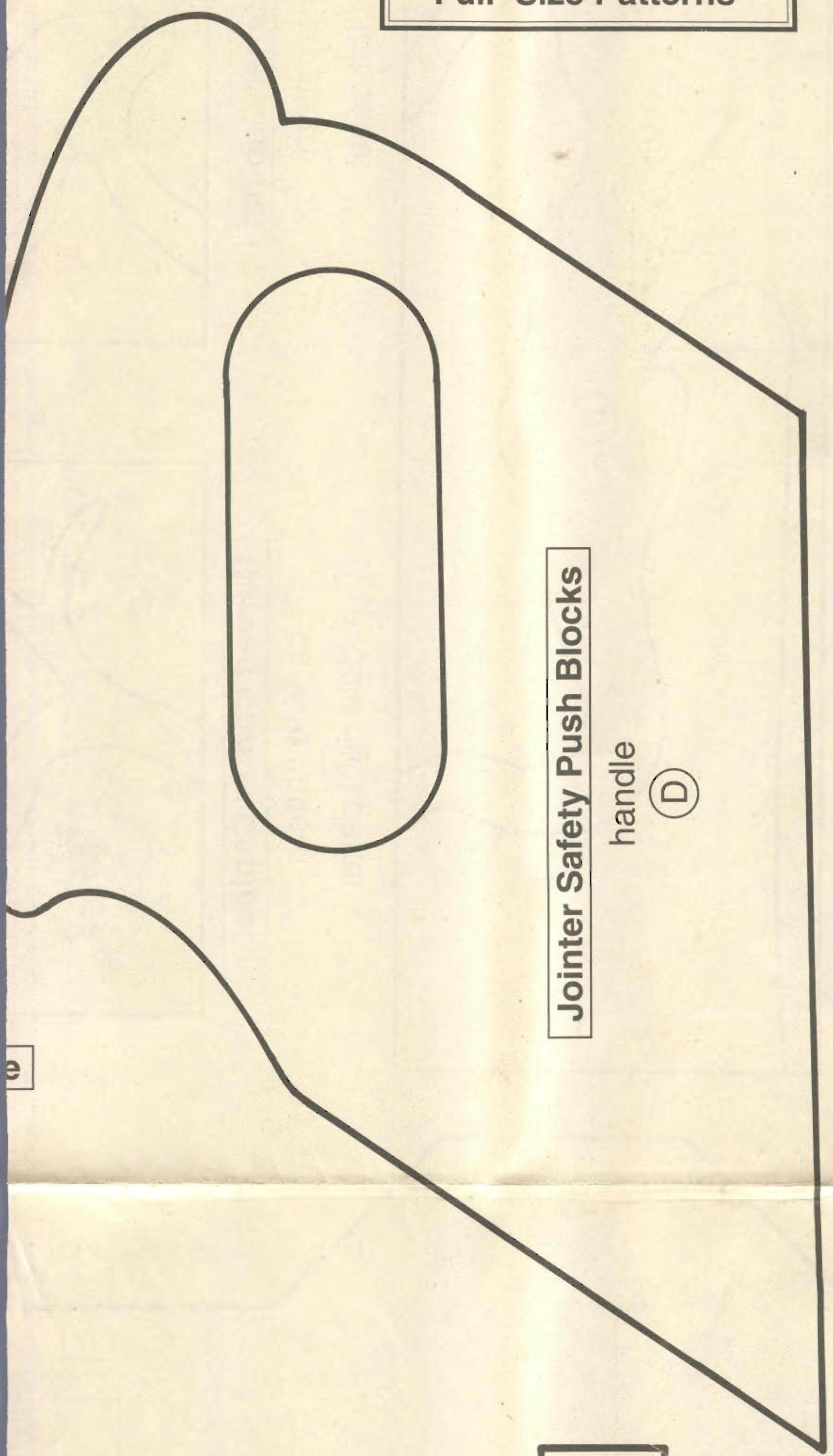
Table

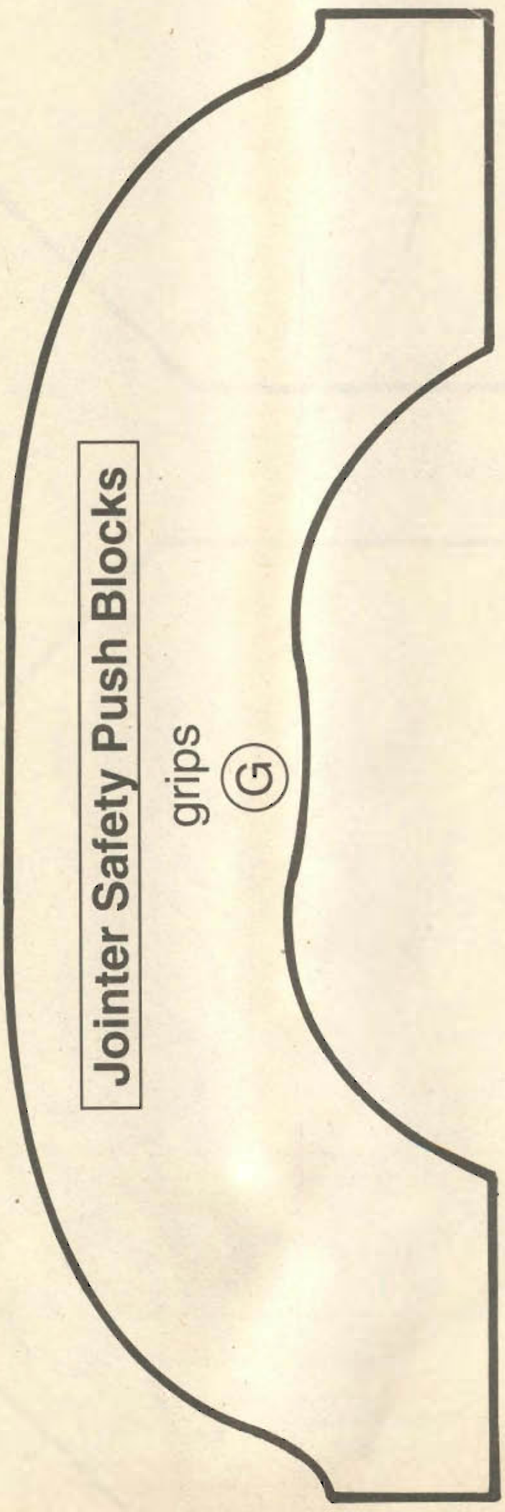
PullOut™ Plans

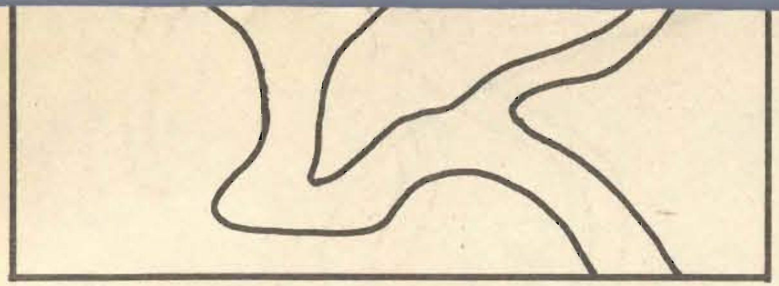
Popular Woodworking No. 66

May 1992 (pages 43–58)

Full–Size Patterns



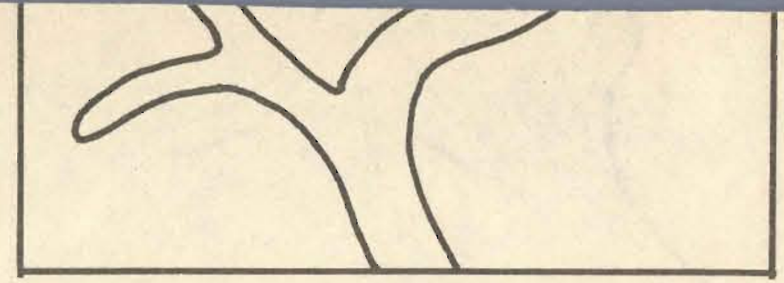




Carved Corner Cabinet

carving pattern

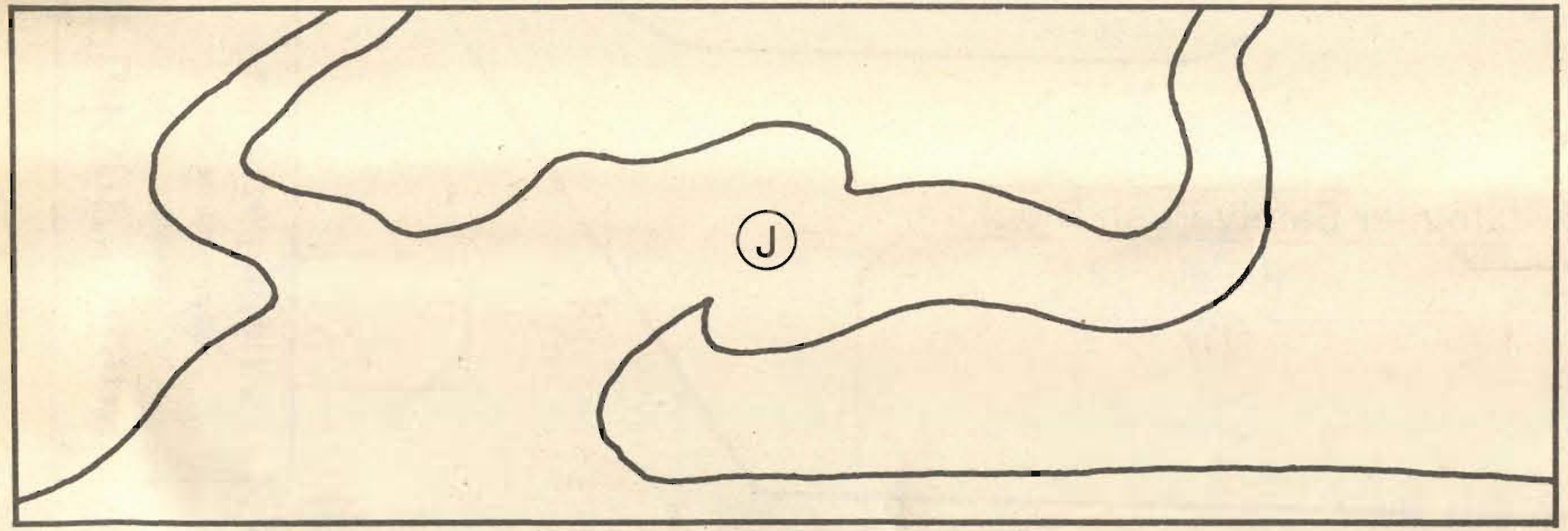
middle left panel



Carved Corner Cabinet

carving pattern

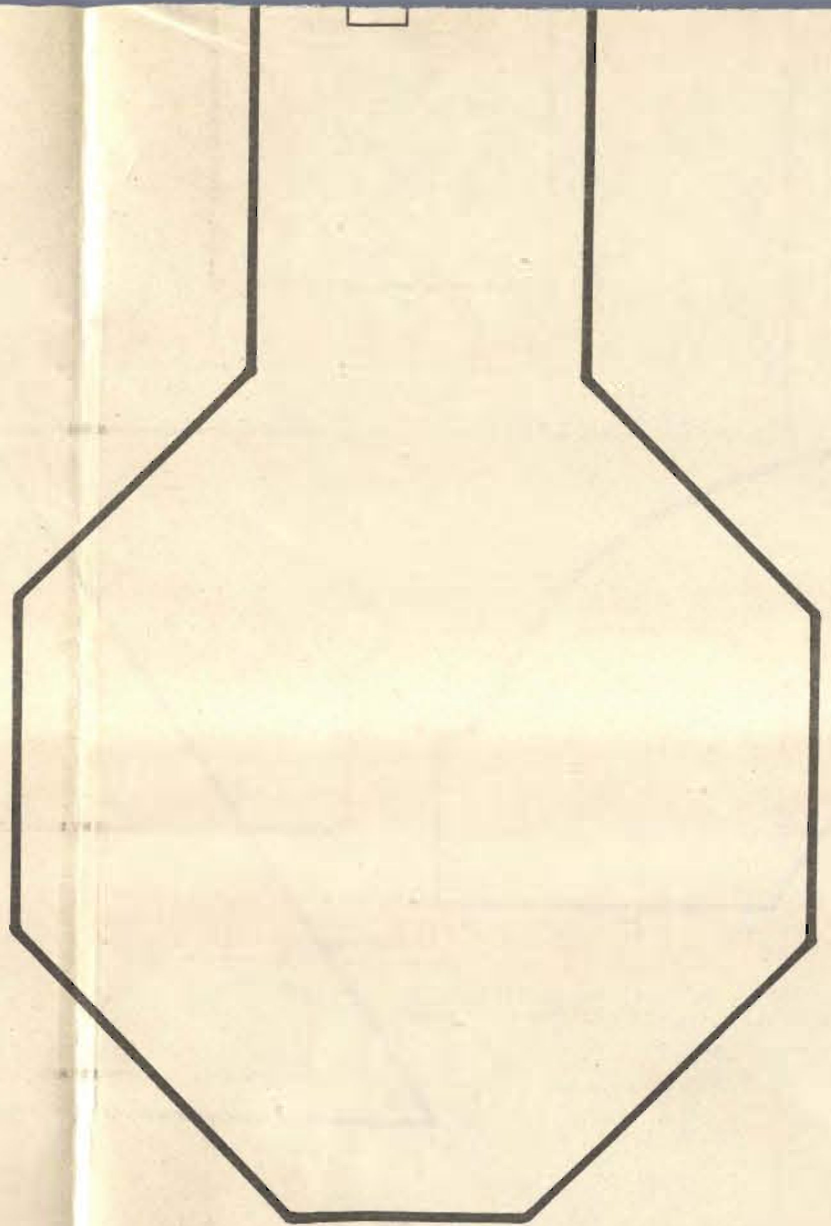
middle right panel

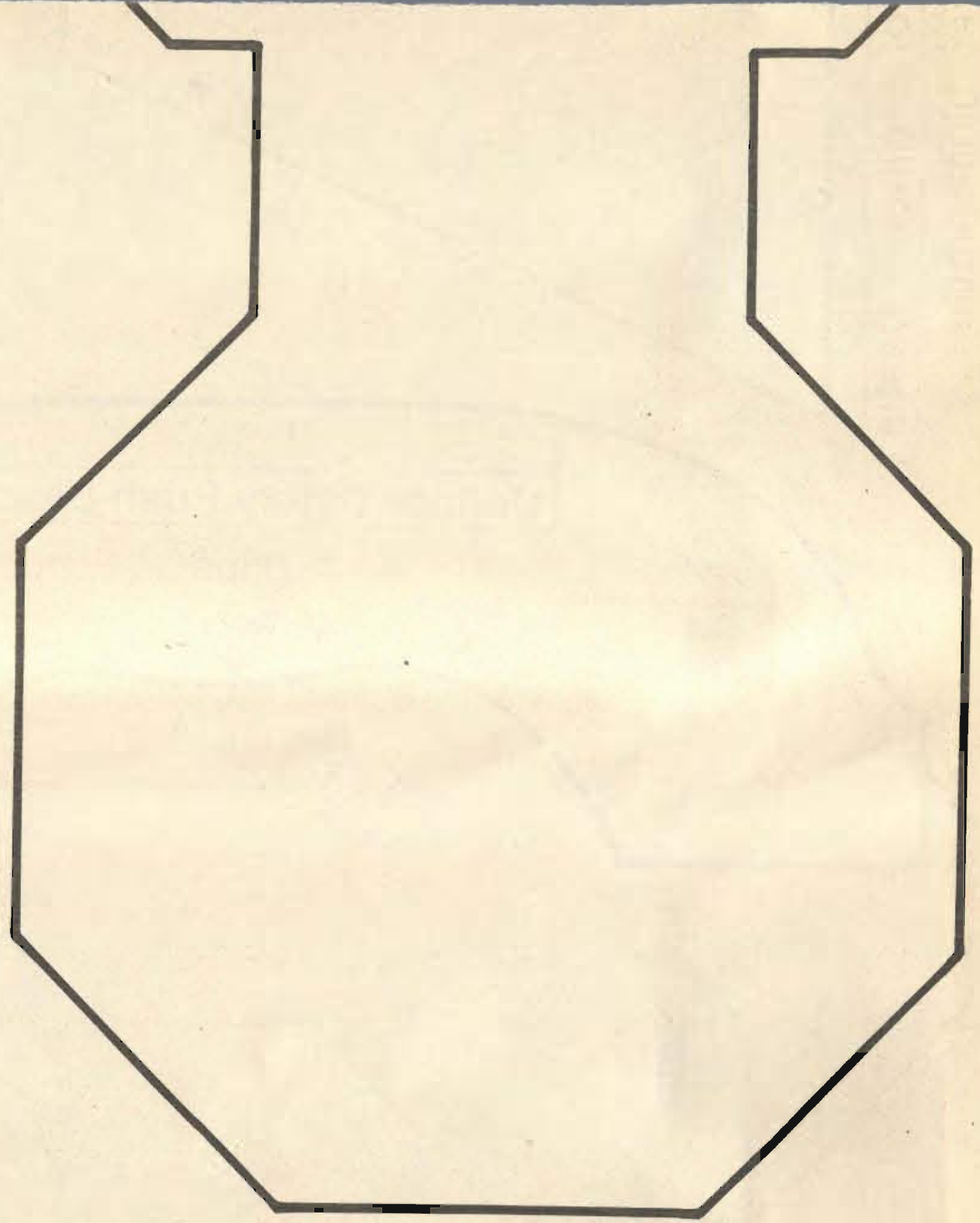


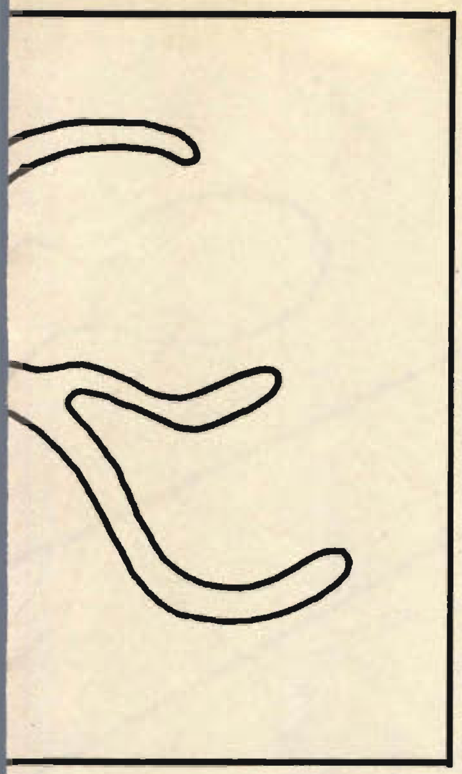
Carved Corner Cabinet

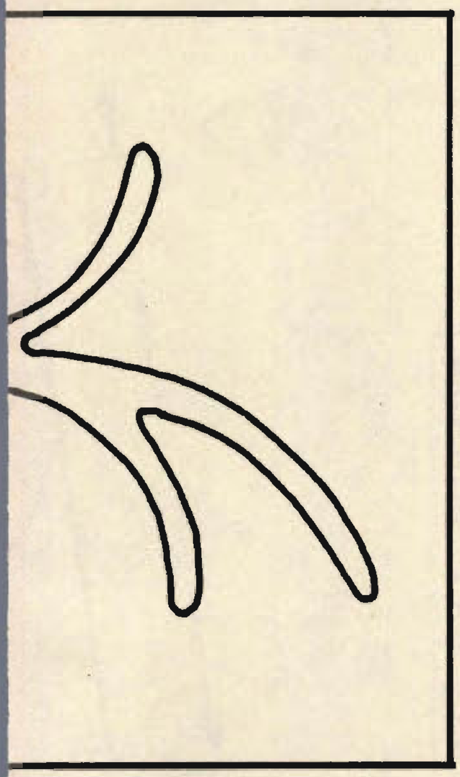
carving pattern

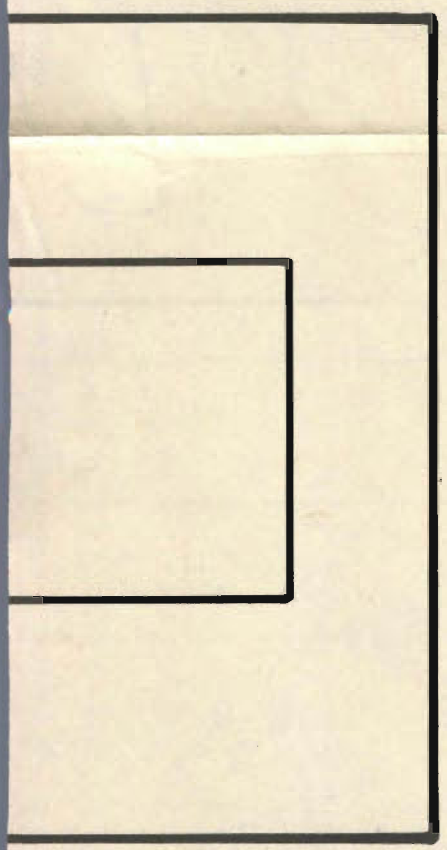
bottom panel





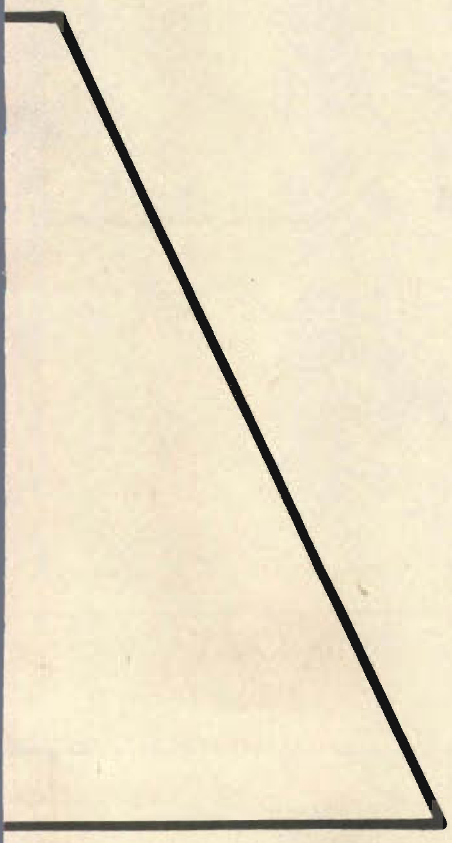






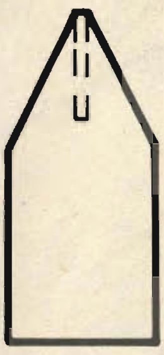
of Engineers Castle

crest blocks



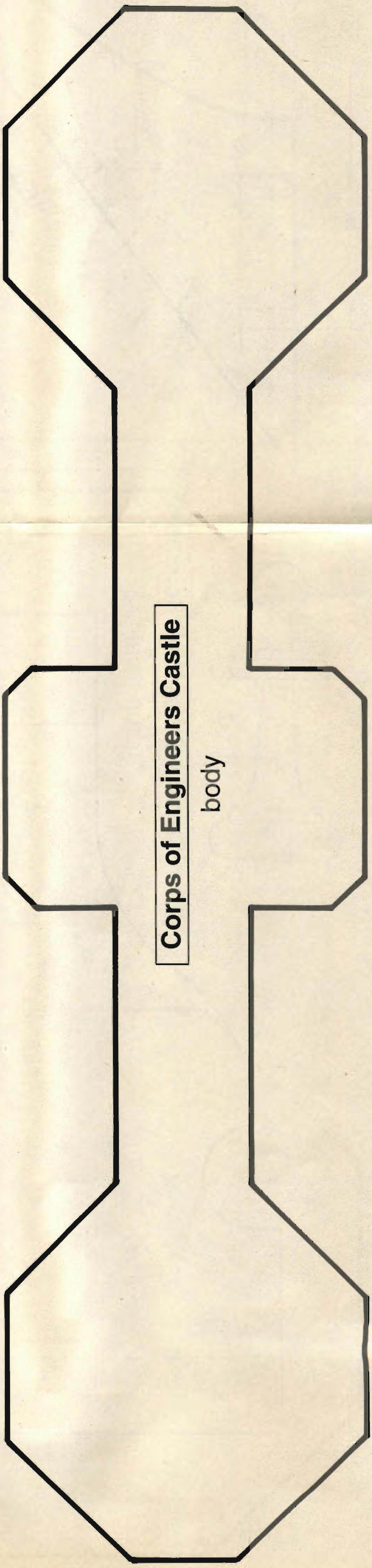
of Engineers Castle

est block profile



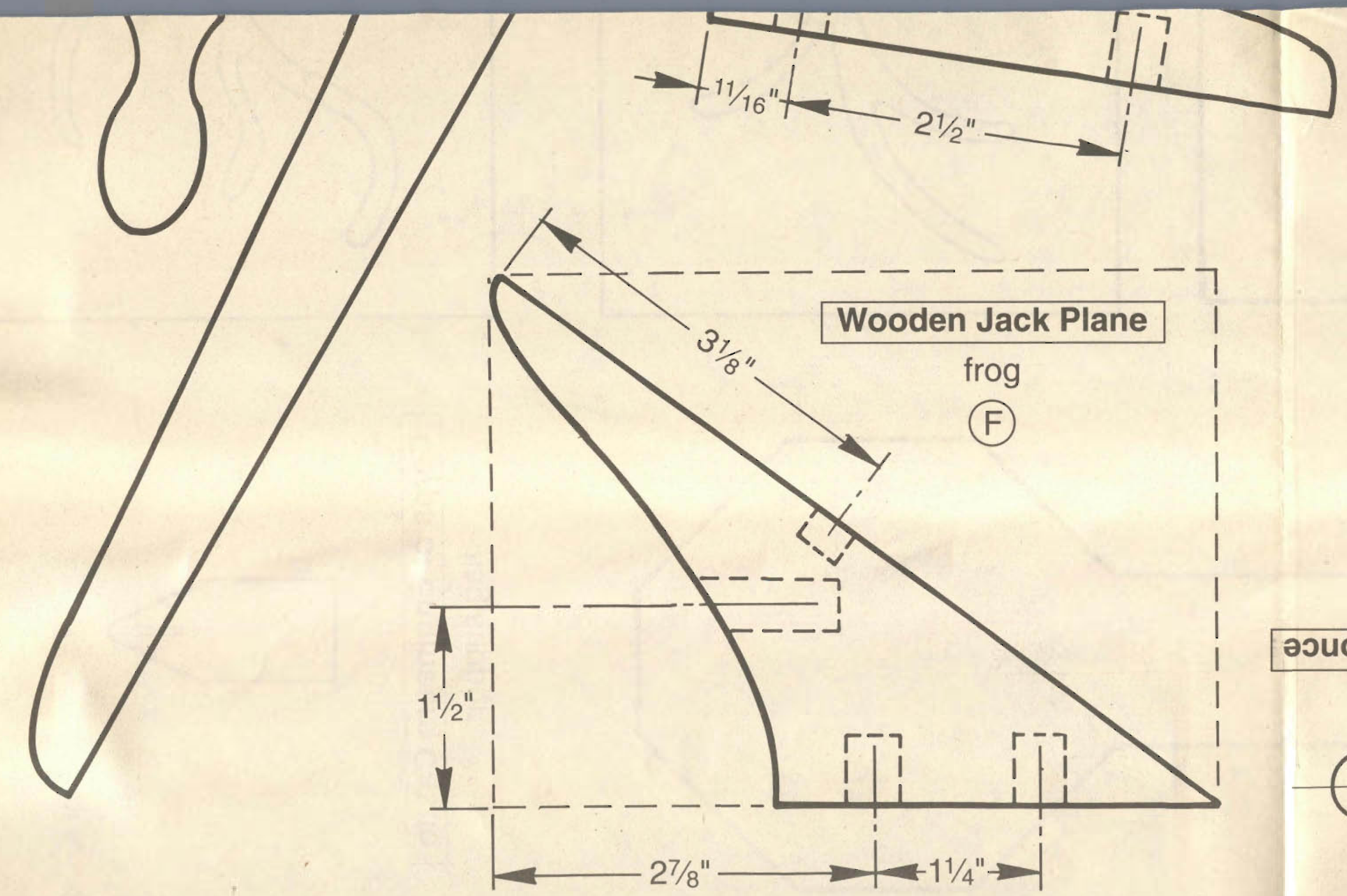
Corps of Engineers Castle

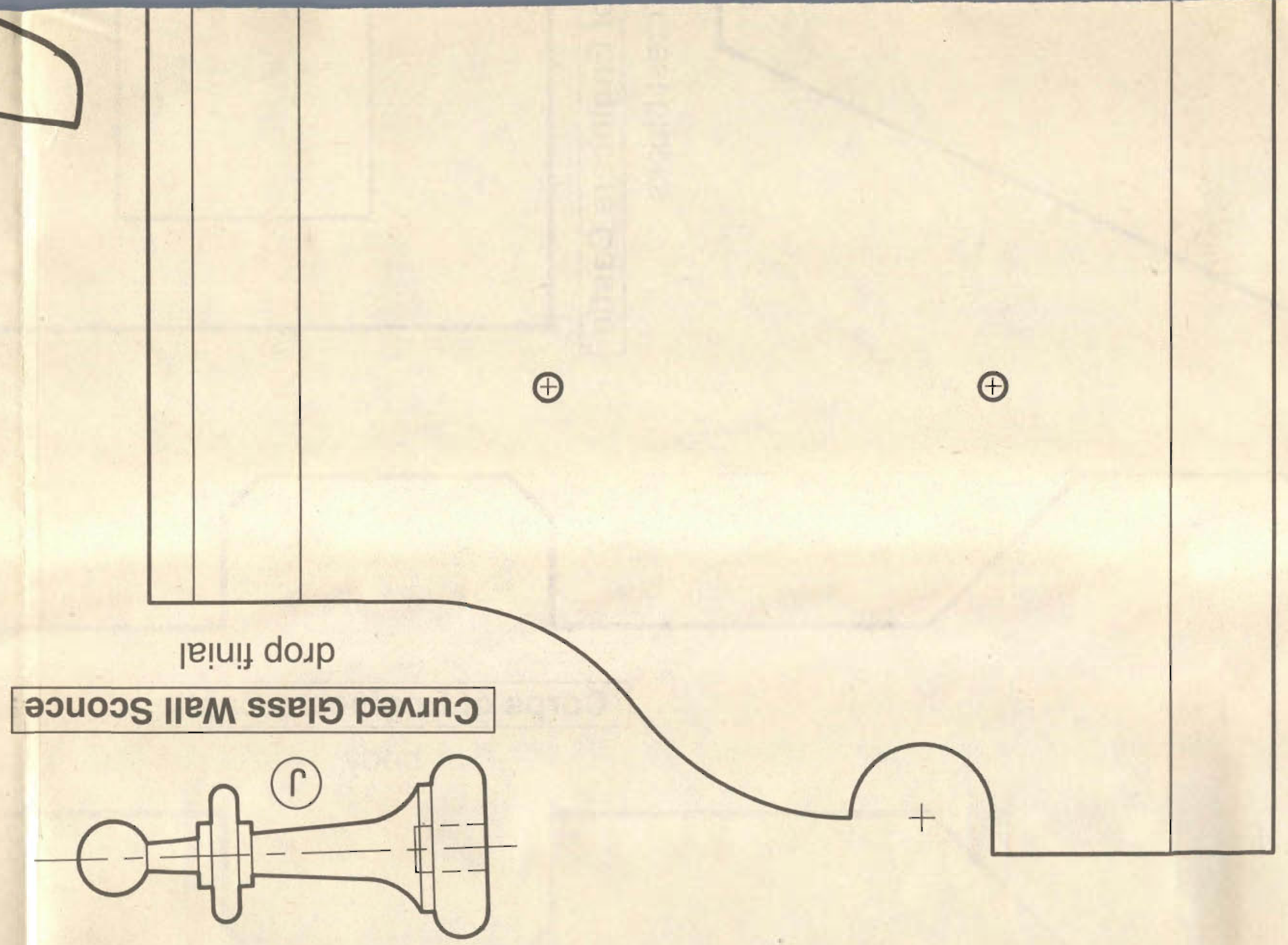
flag support



Corps of Engineers Castle

body


11⁄16"
2½"
Wooden Jack Plane
frog
Ⓕ
3⅛"
1½"
2⅞"
1¼"


Curved Glass Wall Sconce
drop finial
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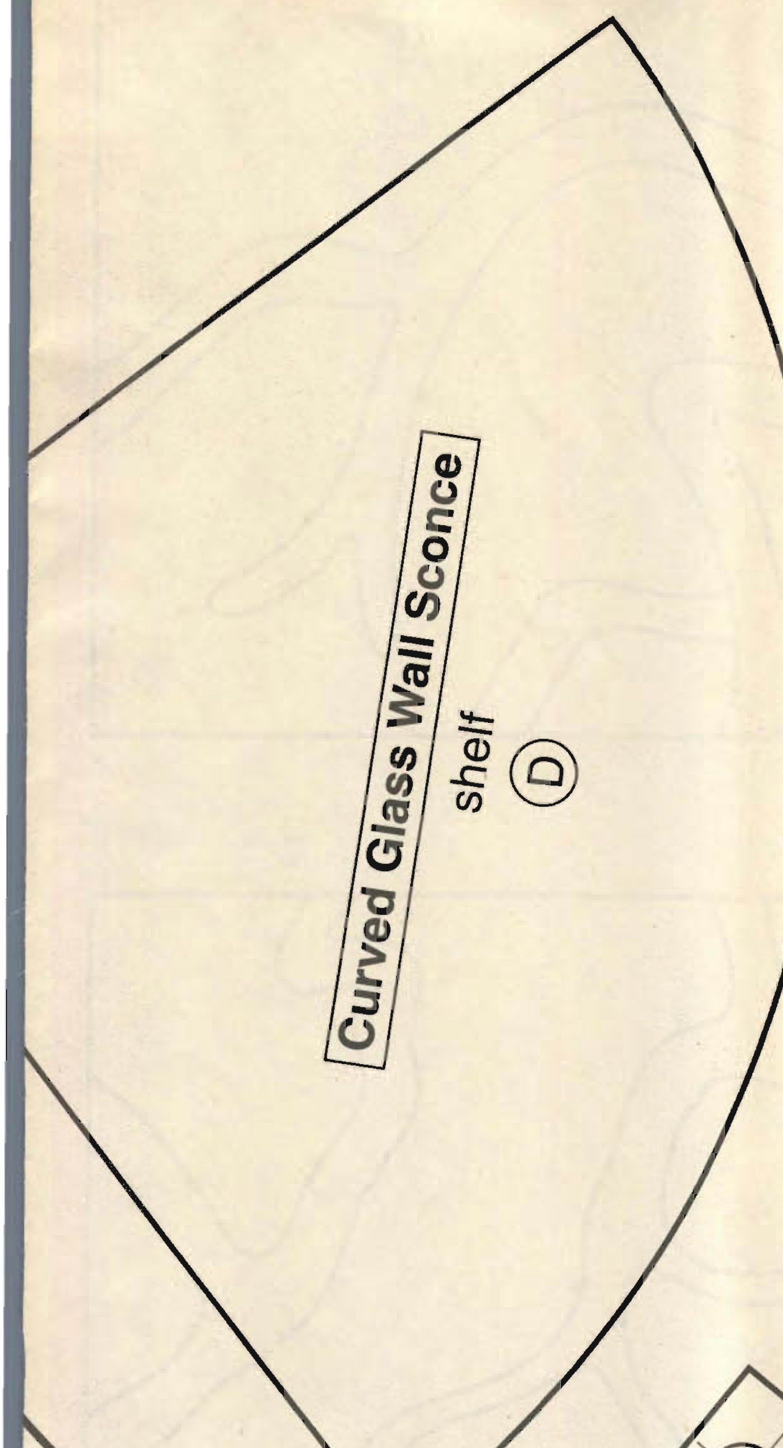
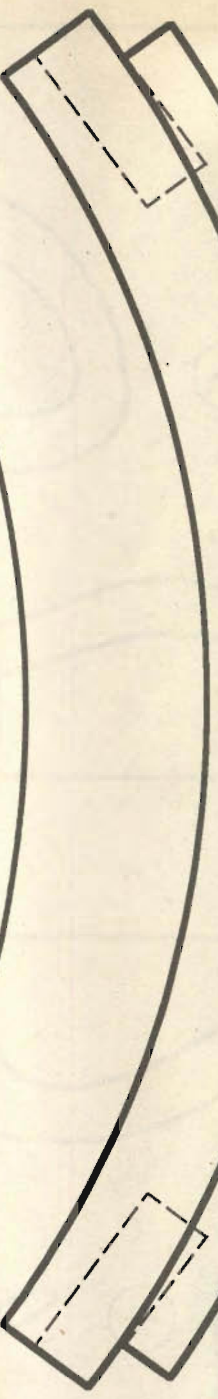


Curved Glass Wall Sconce

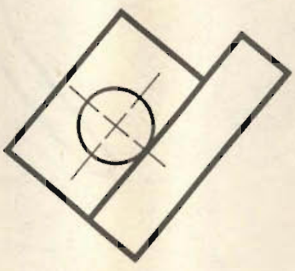
shelf

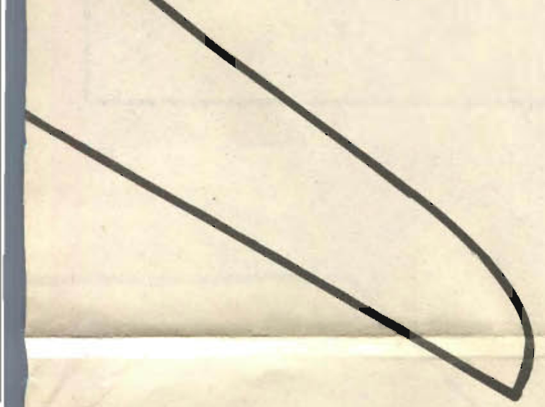
Ⓓ

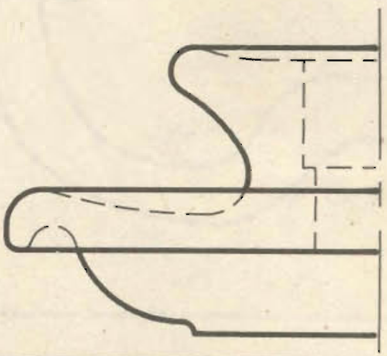


Curved Glass Wall Sconce

door bow



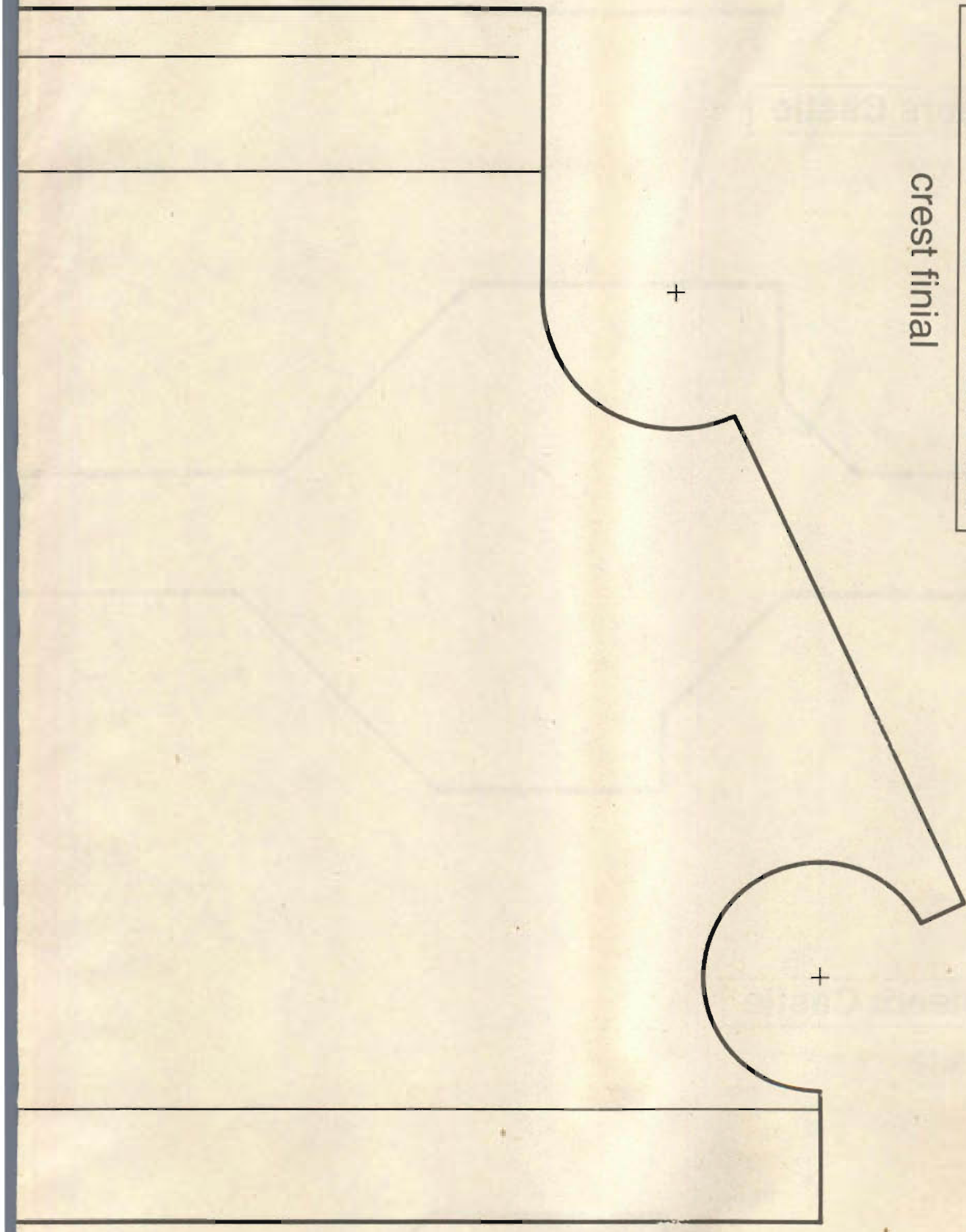


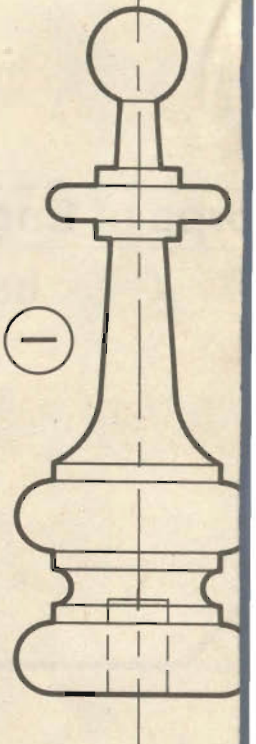


Curved Glass Wall Scon

candle holder

full-size half pattern



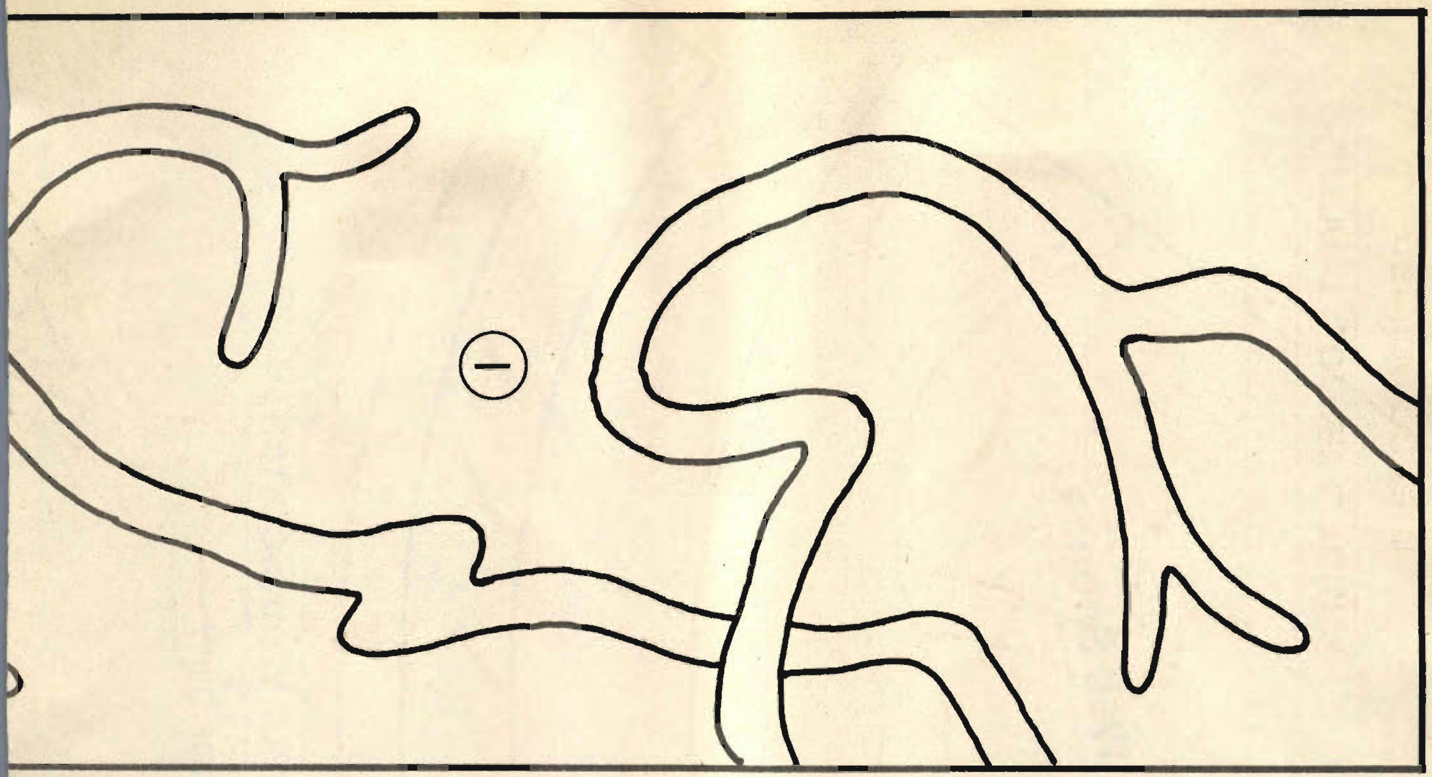


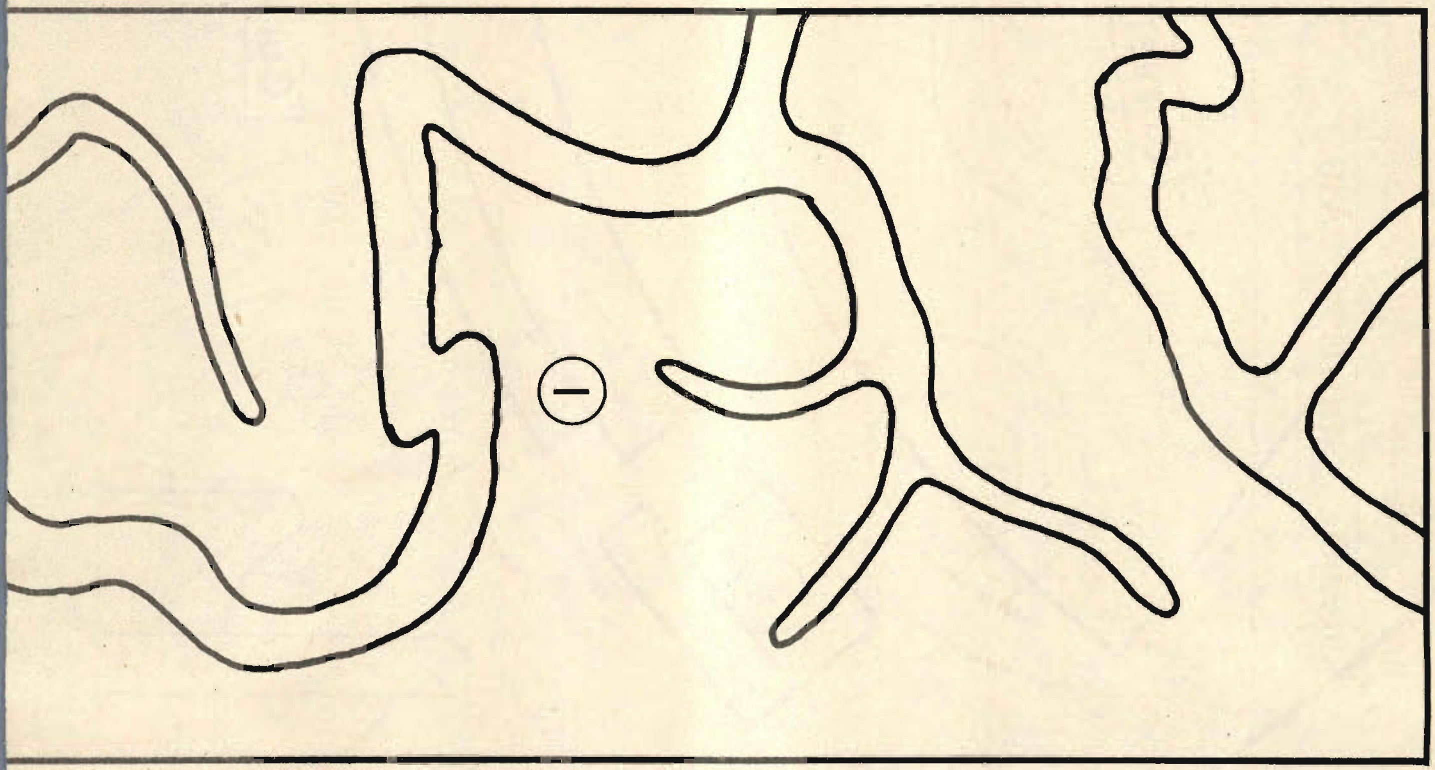
Curved Glass Wall Sconce

crest finial

Ⓘ

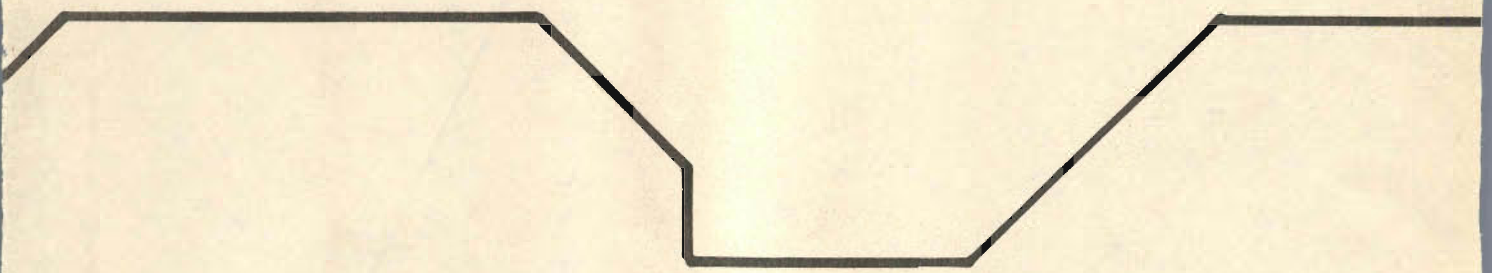
Carefully open staples to remove plans, then bend them closed again.





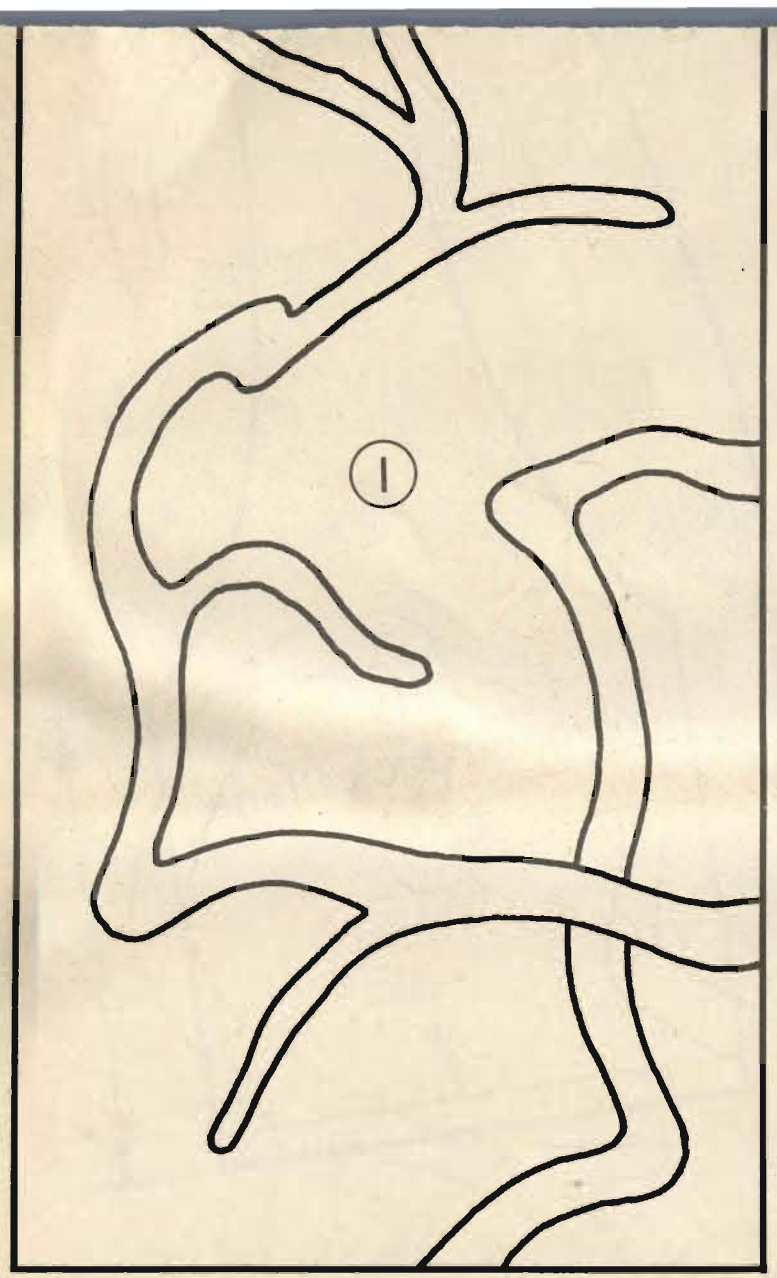
orps of Engineers Castle

base



Corps of Engineers Castle

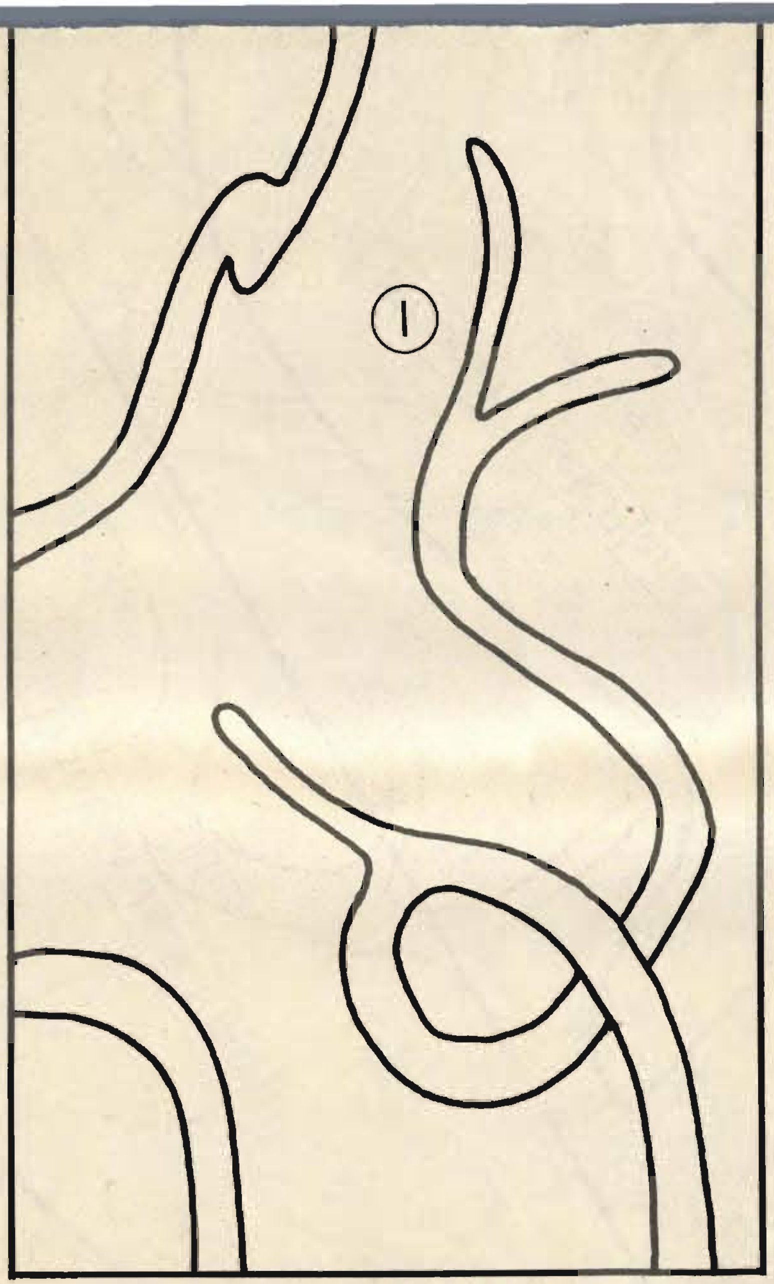
sub base



Carved Corner Cabinet

carving pattern

top left panel



Carved Corner Cabinet

carving pattern

top right panel

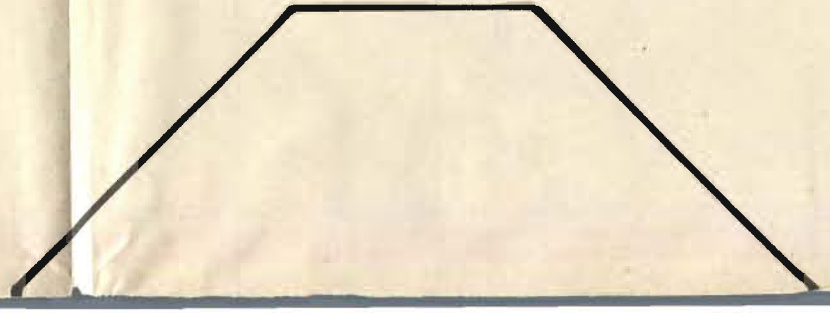
Corp

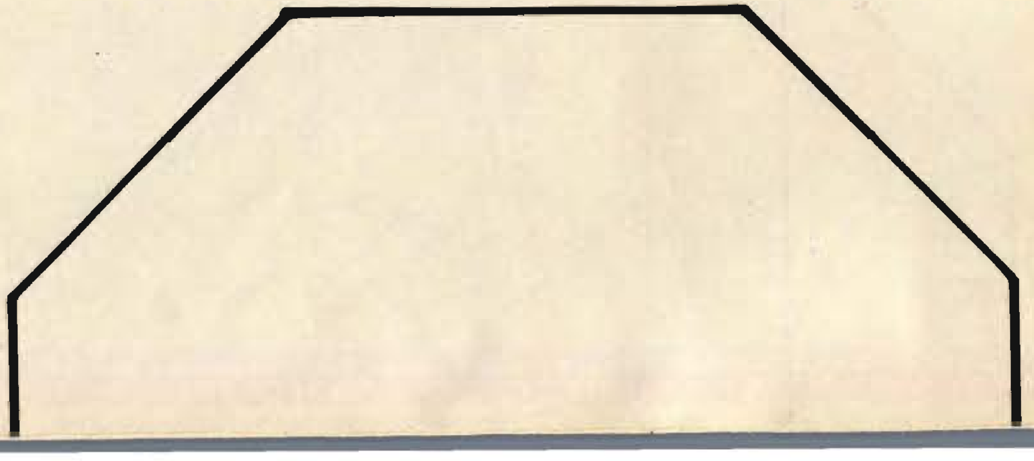
Corp

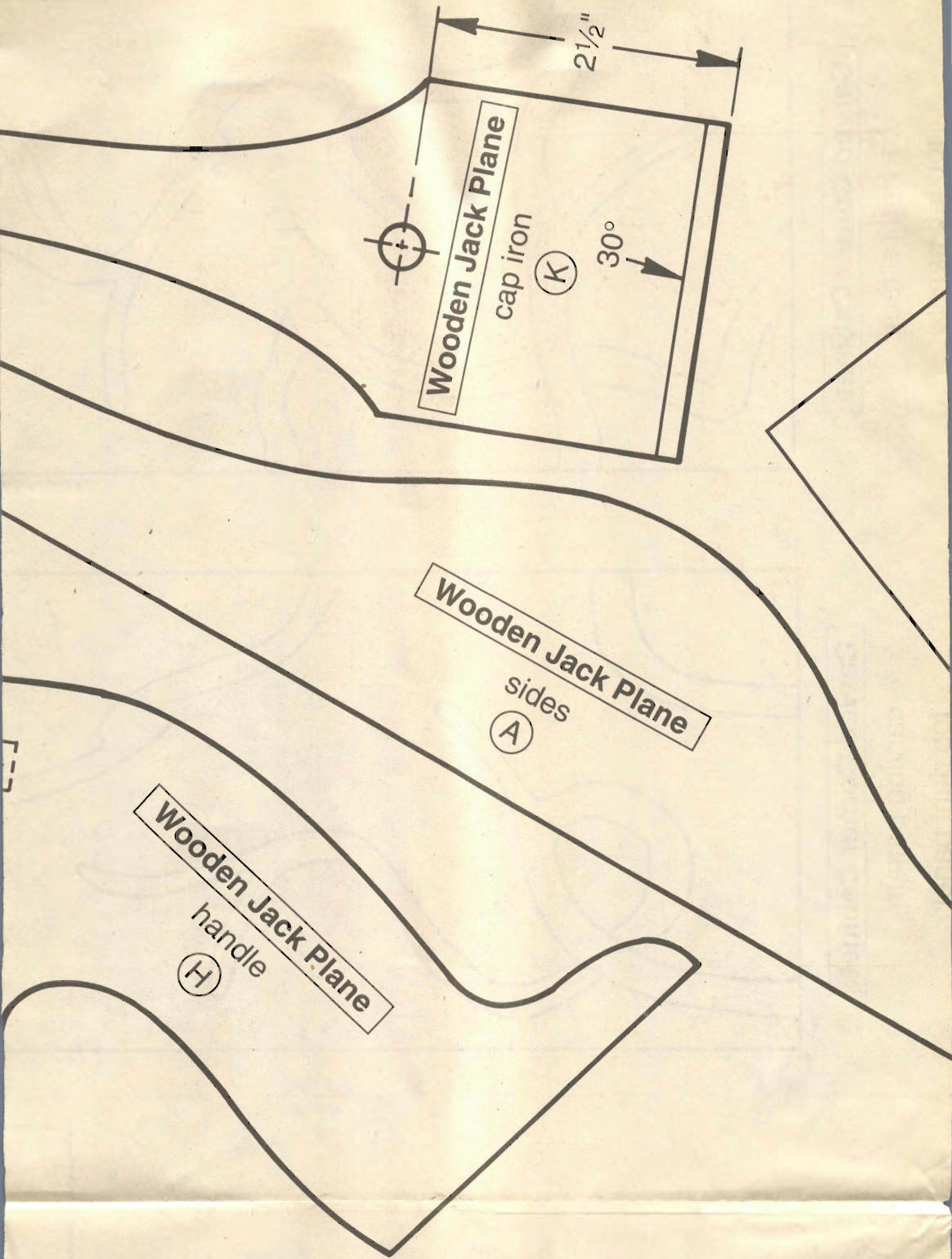
ABCDEFGHI
JKLMNOPQR
STUVWXYZ

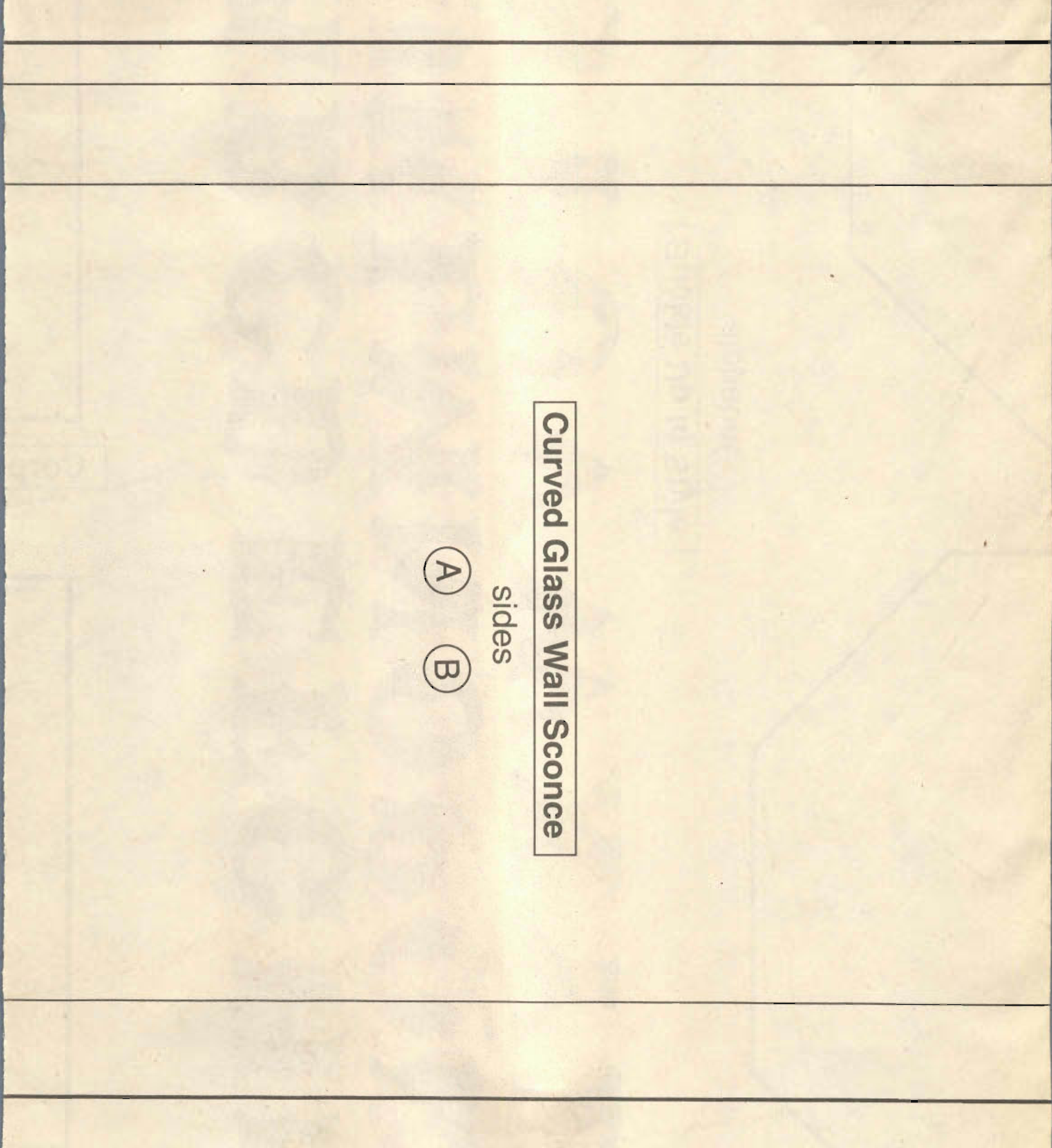
Buckle Up In Style

alphabet






2½"
Wooden Jack Plane
cap iron
Ⓚ
30°
Wooden Jack Plane
sides
Ⓐ
Wooden Jack Plane
handle
Ⓗ


Curved Glass Wall Sconce
sides
Ⓐ Ⓑ

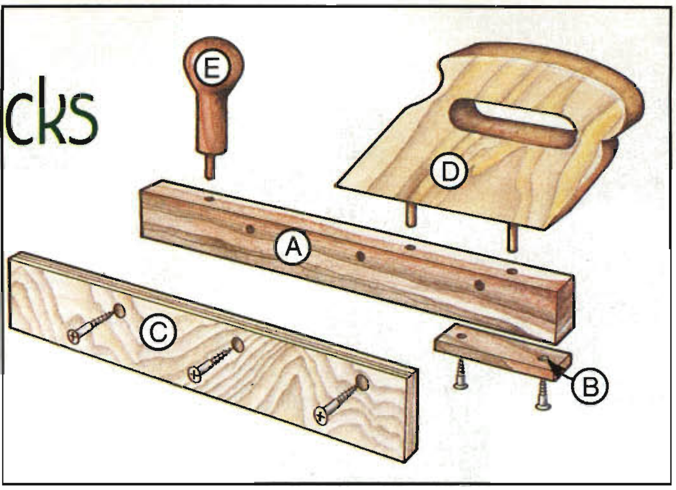
Jointer Safety Push Blocks

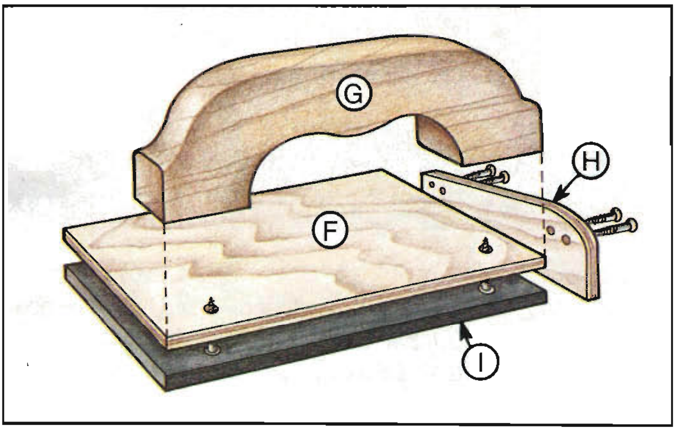
by Devore O. Burch

Many years ago, in a wood shop class, I witnessed a very serious accident involving a jointer. A fellow was pushing a narrow strip through, something slipped and he planed off his right thumb. That was a long time ago, and today a jointer is not considered a "dangerous" machine. Still, I recently heard about a serious accident that occurred when someone planed the flat surface of a knotty board—together with his palm.

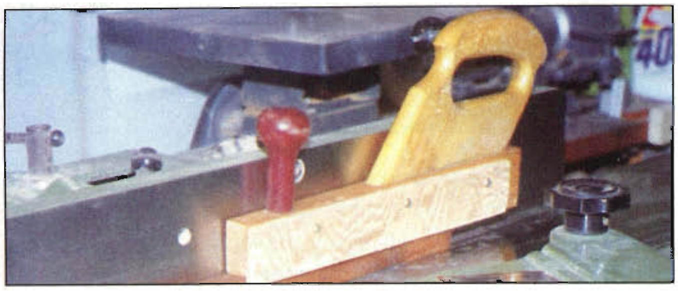
These safety push sticks are designed to keep your hands and fingers away from spinning cutters while letting you maintain complete control of the work piece.

Devore O. Burch is a woodworker in Fort Worth, Texas.





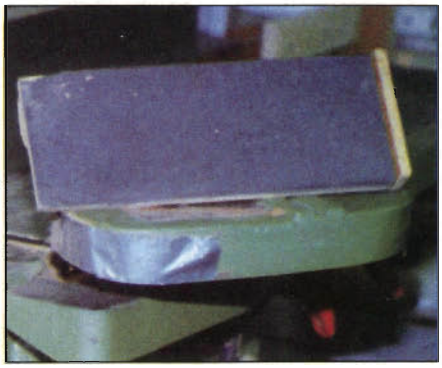
Bob Chaplia and Ginny Pruitt



The handle and knob must clear the fence for you to get a good grip and to avoid slipping if your knuckles hit.

author

This block has the stop in place to help feed the wood through the jointer.



Use contact cement to attach neoprene to the planing blocks for a safe, secure grip.

The block with the stop attached is the rear pusher.

Jointer Safety Push Blocks

Cutting List

		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
1	A	¾"	1⅝"	12½"	thin shoe
1	B	¼"	¾"	3½"	heel
1	C	¼"	1¾"	11"	fence
1	D	¾"	6"	9"	handle
1	E	1½"	1½"	3"	knob
2	F	¼"	3"	7¾"	plates
2	G	¾"	2½"	7¾"	grips
1	H	¼"	1½"	3"	stop
2	I	¼"	3"	7¾"	friction pads

Narrow Strips

Jointing narrow strips requires a thin but sturdy push block. Cut out the five pieces (A,B,C,D and E) given in the Cutting List. Make the thin shoe (A) and heel (B) from a hardwood such as oak or maple. The fence (C) is plywood and the handle (D) and knob (E) are softwoods—pine or fir. Use a lathe to turn the knob, or whittle it by hand. Look in the PullOut™ Plans for a full-size pattern of the handle. Ease the edges on the handle. The knob and handle must protrude high enough above the fence for you to get a good grip. Assemble the parts as shown in the top Figure.

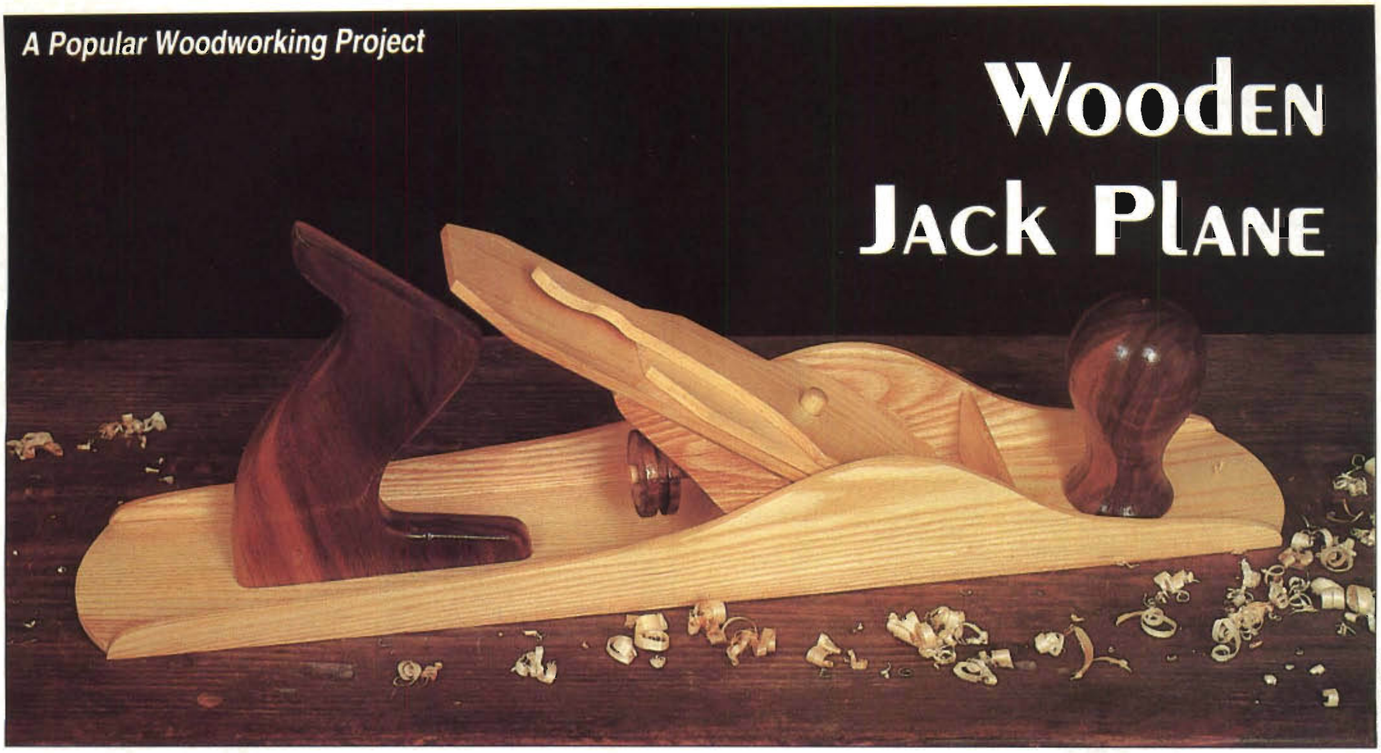
Planing Blocks

The plates (F) and the stop (H) are plywood—the grips (G) are softwood. Get the proper shape for the grip from the PullOut™ Plans. Ease the edges of the grips before you install them on their bases. Note that the grip is offset so your hand clears the fence. Screw and glue the stop to one of the blocks. The friction pads are best made from neoprene rubber which can be found at your local water sports shop or fabric store. Contact-cement them in place. The front block guides while the rear block with the stop is the pusher.

Finish or not, as you choose. **PW**

A Popular Woodworking Project

WOODEN JACK PLANE


Deborah Porter

by John Farwell

Before the hand plane was developed, craftsmen trimmed lumber to size with a hand chisel. This is a difficult procedure to master—any error will surface in the final product. One of those early woodworkers finally had the idea of mounting a chisel in a block of wood to hold it at a true and constant angle to the work. Since then, hand planes have evolved into the precision-built planes we use today. The project in this article is based on the jack plane. One of the most commonly used hand planes, it is considered by many the "Jack of All Work" because it can cut deeper and plane a truer surface than most planes. Though this plane is made to scale, it's not meant for actual woodworking. It's an interesting conversation piece to have around the shop.

First, study the Assembly Figure on page 61 to become familiar with the pieces and how they go together, then cut all the parts to their rough dimensions as given in the Cutting List. Use light–colored hardwoods to represent metal parts and dark wood for the handle (H) and knob. Transfer the patterns in the PullOut™ Plans for the sides (A), frog (F), handle and cap iron (K) and cut them out on the scroll saw. Cut out the two sole pieces (B) and (C) according to Figure 1 and drill the 3/8" holes. Make the adjuster by gluing up the three disks shown in Figure 2, then drill the 1/4" hole for the dowel. An alternative method uses three brass fender washers and 1/4" brass rod. Cut out the iron (G) and chip breaker (J) according to Figure 3 and drill the 3/8" holes. Also drill the 3/8" holes in the frog, handle and cap iron. Turn the knob on your lathe according to the dimensions in Figure 4.

Check all the pieces to make sure they are dimensionally correct and fit properly. Sand the pieces with #120 then #220 sandpaper to smooth the surfaces and remove any marks left by cutting tools. Keep all the edges and corners sharp and take care not to distort them. The broad end of the cap iron can be tapered or rounded if desired. After all the pieces are ready, dry fit them. If the pieces fit, begin the assembly. Glue the sides to the sole pieces; then install the divider (D) to complete the sole assembly. After the glue has dried, sand off any excess. Glue the adjuster (E) to the back of the frog; then place them between the side pieces of the sole. Position the handle and knob (I), then the blade chipper and clamp.

Apply a clear coat of Danish oil or varnish to the completed plane. If you didn't use walnut on the handle and knob, you can stain them with a dark stain before you glue them in place. Lightly sand with #000 steel wool and apply a coat of paste wax. PW

John Farwell is a drafting student at ConVal High in Peterborough, New Hampshire.

Figure 1. Front and Back Soles

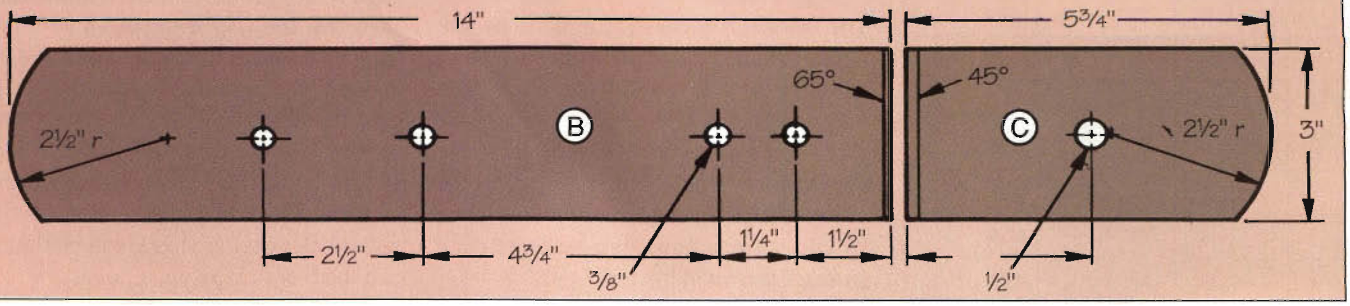


Figure 2. Adjuster

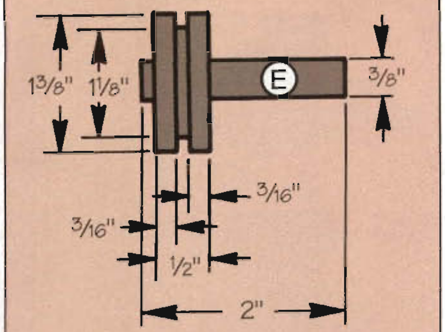
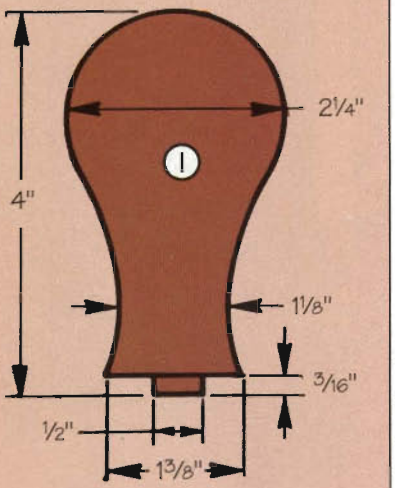


Figure 4. Knob

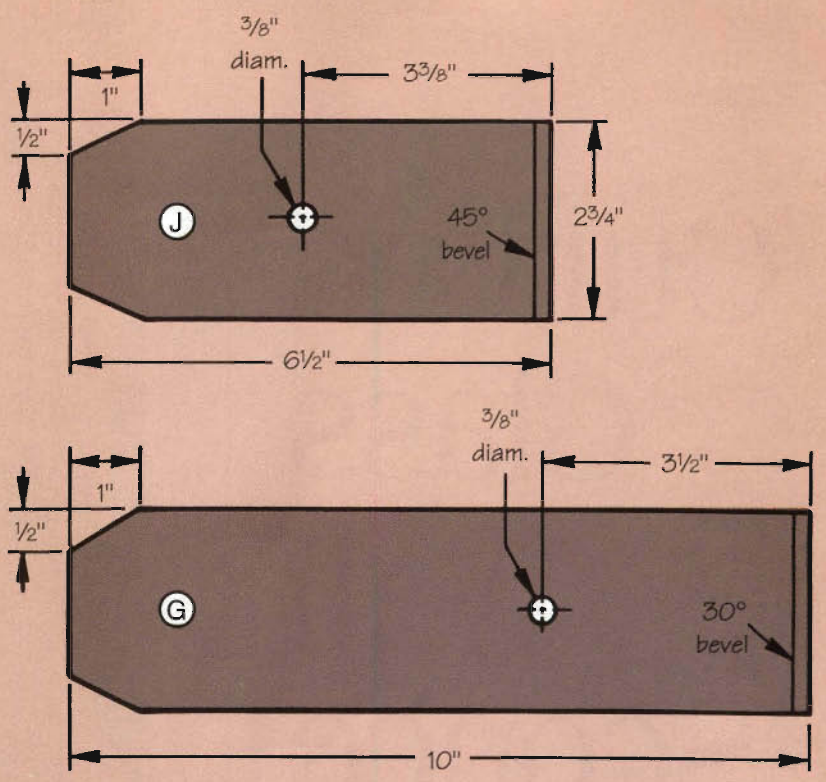


Wooden Jack Plane

Cutting List

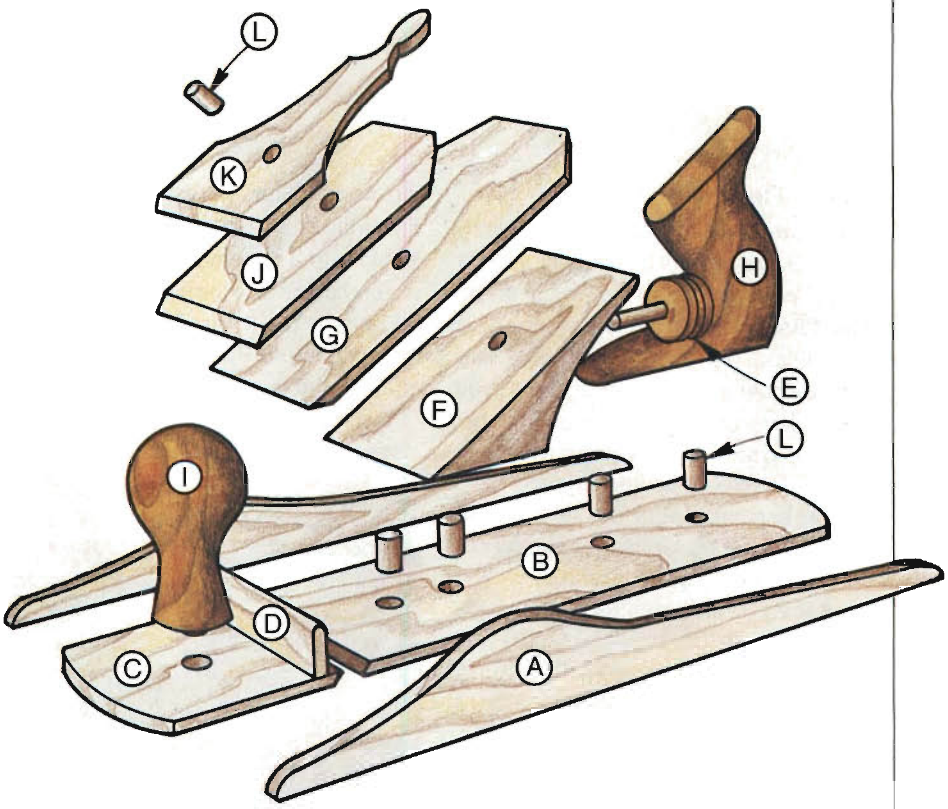
Qty	Part	Finished Size T	W	L	Piece
2	A	3/16"	2½"	19"	sides
1	B	3/16"	3"	14"	sole back
1	C	3/16"	3"	5¾"	sole front
1	D	3/16"	1½"	3"	divider
1	E	1⅜" diam.		1¾"	adjuster
1	F	2¾"	4"	5¾"	frog
1	G	⅛"	2¾"	10"	iron
1	H	¾"	4¾"	6¾"	handle
1	I	2¼" diam.		4"	knob
1	J	3/16"	2¾"	6¾"	chip breaker
1	K	3/16"	2¾"	7¾"	cap iron
5	L	⅜" diam.		¾"	pins

Figure 3. Iron and Chip Breaker



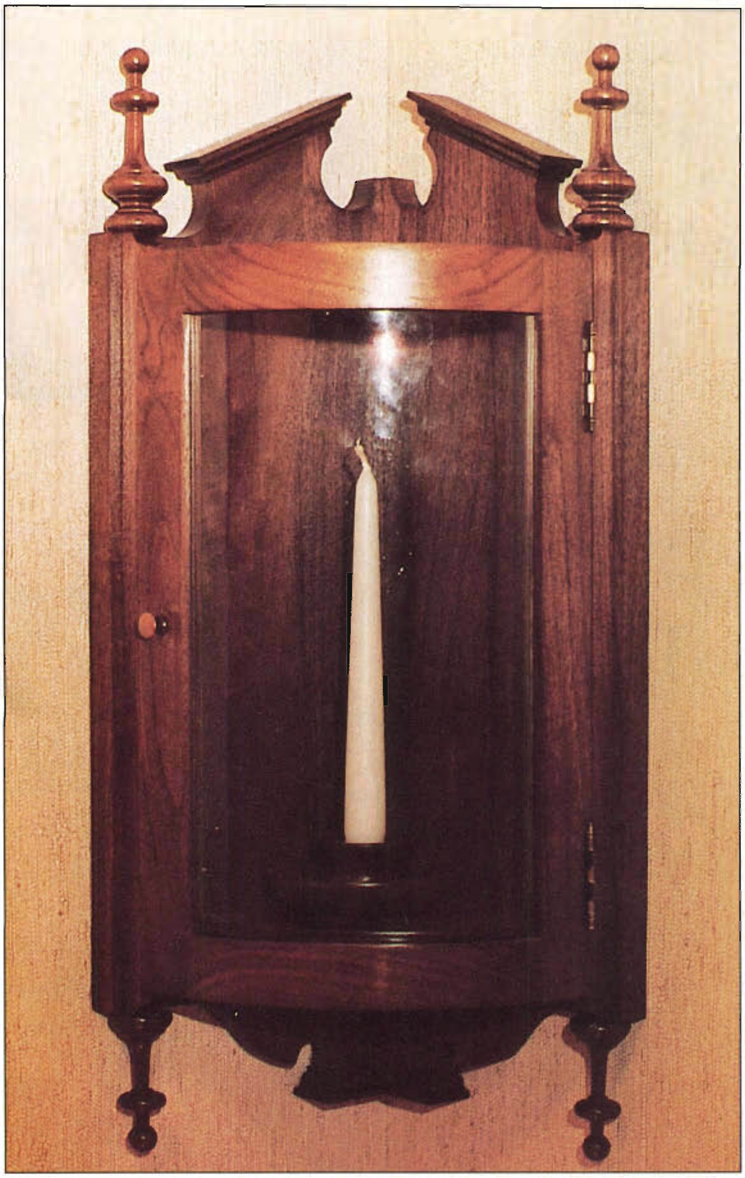
Bob Chapla/Ginny Pruitt

Plane Assembly



A Popular Woodworking Project

Curved Glass Wall Sconce



by Rod Beemer

This bow–front sconce designed by my son Chuck is a fine introductory project for working with curved glass. It combines straightforward joinery, lathe work and a basic curved glass door frame that will show you how easy and attractive curved glass projects can be. When you're done, you'll have a striking accent piece and one more skill in your woodworking repertoire. See the accompanying article "Friendly Magic" on page 66 for information on obtaining the curved glass door panel.

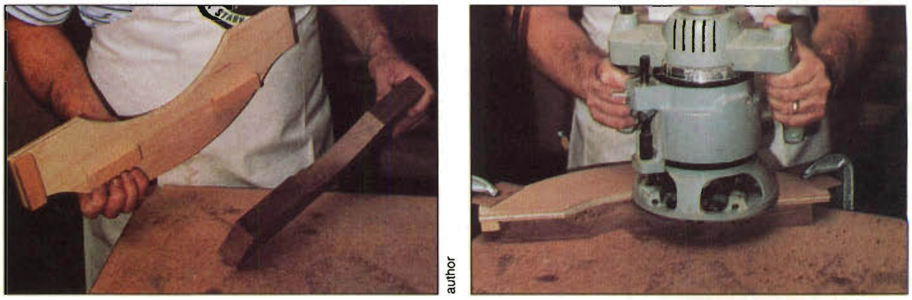
Cut the sconce sides (A and B), side stiles (C), shelf (D), bow blanks (E) and door stiles (F) according to the Cutting List. Using the full–size pattern in the PullOut™ Plans and Figure 1, shape the two sides. They've been designed so you can either make the radius cut–outs on the band saw or drill them out. Drilling these will keep the sanding to a minimum and ensure crisp, exact lines. Shape the side stiles as shown in Figure 1. You'll find a full–size pattern for the shelf in the PullOut™ Plans. Rout an ogee on the curved edge.

Accurately ploughing the dadoes in the sides for the hinge and latch side stiles (C) is critical (Figure 2). Otherwise the opening will be too narrow or too wide for the door. Don't secure the stiles in the dado until you have the door completed—fit them in dry so you can check the finished door in the opening later. If the door turns out to be a bit too wide, you can joint the side stiles to accommodate—rather than

(continued on page 68)

***Rod Beemer's** shop, Furniture Art, is located in Salina, Kansas.*

Use the bow pattern you'll find in the PullOut™ Plans to make a template for routing the curved glass rabbet. Clamp the template in place and use a straight bit in your router.



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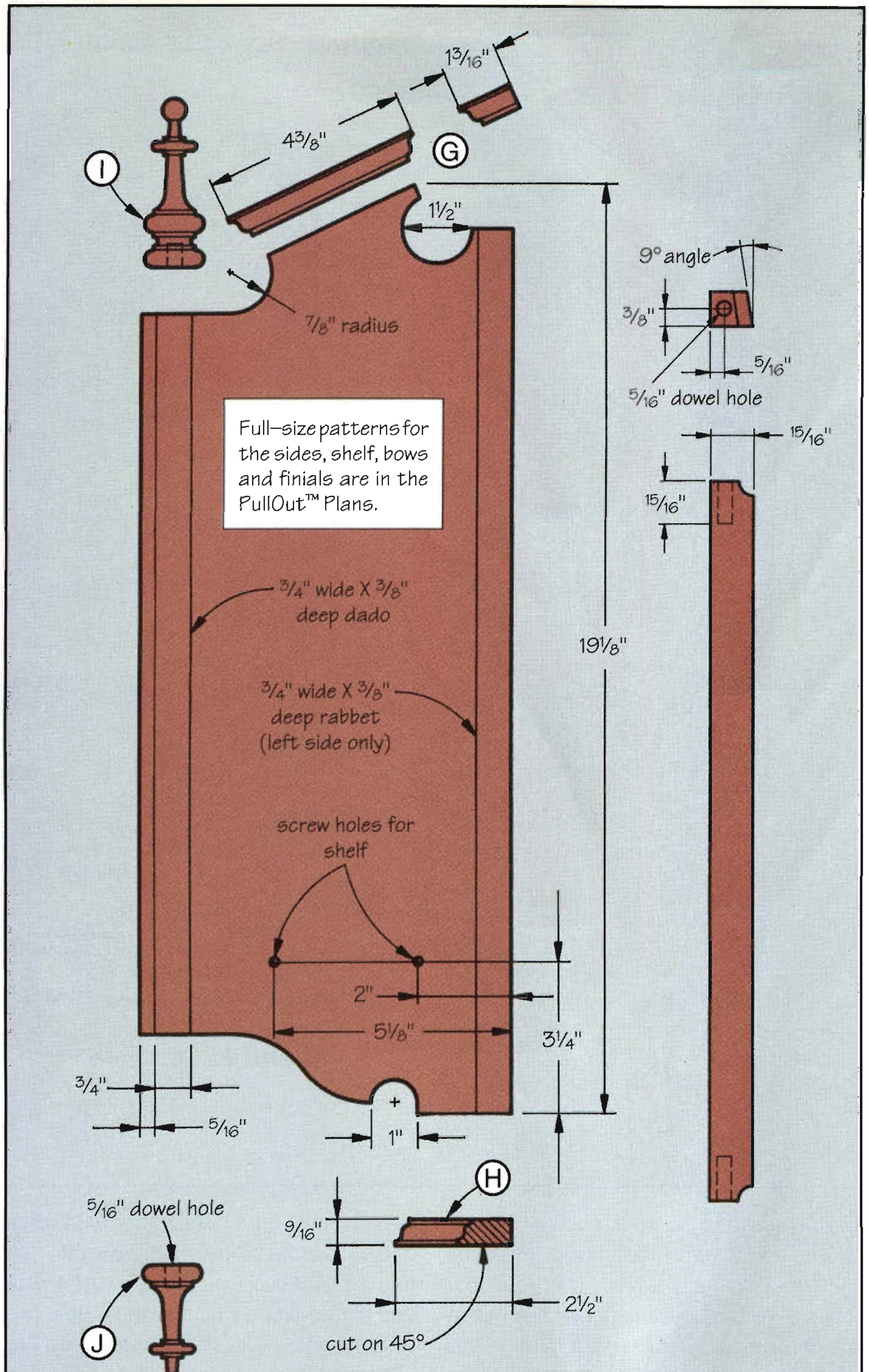


Full-size patterns for the sides, shelf, bows and finials are in the PullOut™ Plans.

Figure 1. Sconce Sides (B) and Stiles (C)

Tom Larson

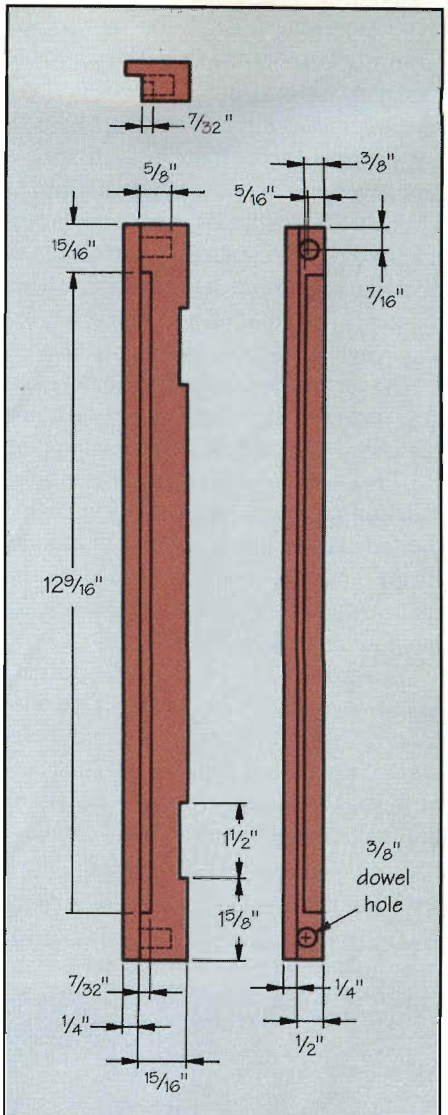
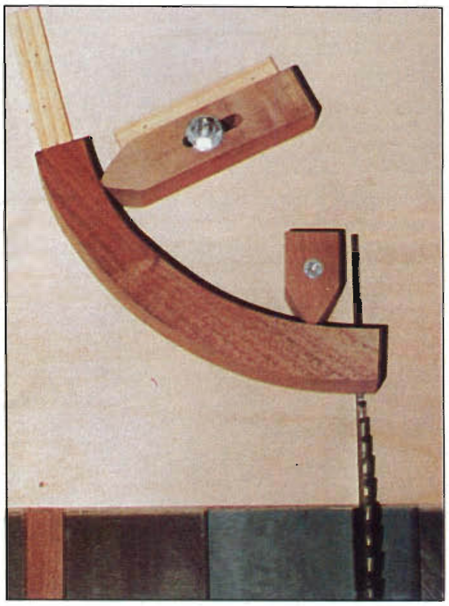
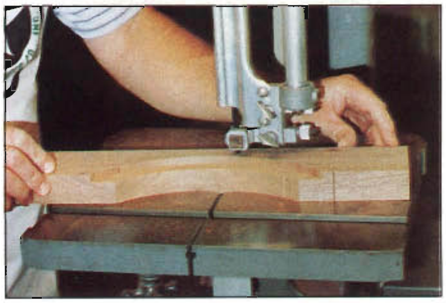


Figure 2. Door Stiles (F)

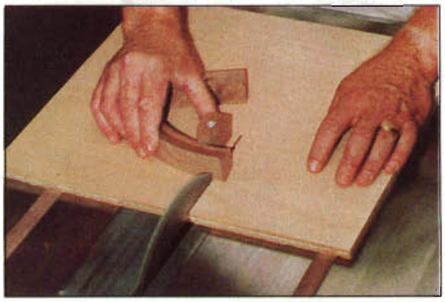
Construct this jig to cut the door bows to length on your table saw. Making the stops adjustable is necessary to ensure the proper angle of cut.



Mark the outside radius of the bow using the full-size pattern, and bandsaw along the outside of the line.



After cutting one end of the bow, mark the net length and reset the stop before cutting the other end.



tinker with—the door. If the door is too narrow, you'll only have to make a new set of slightly wider stiles.

Let's tackle the curved door. As with any project of some complexity, there are *as many* approaches as there are woodworkers. The method shown here will produce excellent *results* with a minimum of equipment. And if you take the time to build the simple jigs that I'll describe along the way, you'll save time and frustration.

Center the full-size pattern for the door bow (in the PullOut™ Plans) on the blank (E) and bandsaw the inside radius first. Now make a template appropriate to the radius of your router guide bushing. Clamp the template in place and rout the rabbet for the glass 5⁄16" deep. Then bandsaw the outside radius of the pattern and sand (see the photos on pages 66-67).

You're ready to cut the bows to their finished length. The jig shown in the photos on page 67 really comes in handy here, and the results are superior. The end cuts on the bows must be exact and consistent, or the door might be racked beyond use.

After the bows are cut to finished length, set them aside and shape the door stiles (F) as shown in Figure 2. Locate and drill the dowel holes in the stiles and bows; then rout the glass rabbets in the door stiles. The hinge–side door stile has a second rabbet (Figure 2) cut to allow the glass to clear the stile when you install it. I used a table–mounted router with fence and 3⁄8" bit. Set stops on the router table's fence to end–stop the rabbet 1 1⁄4" from the end of the stile. Square up the rabbet with a chisel and the door stiles are ready for assembly.

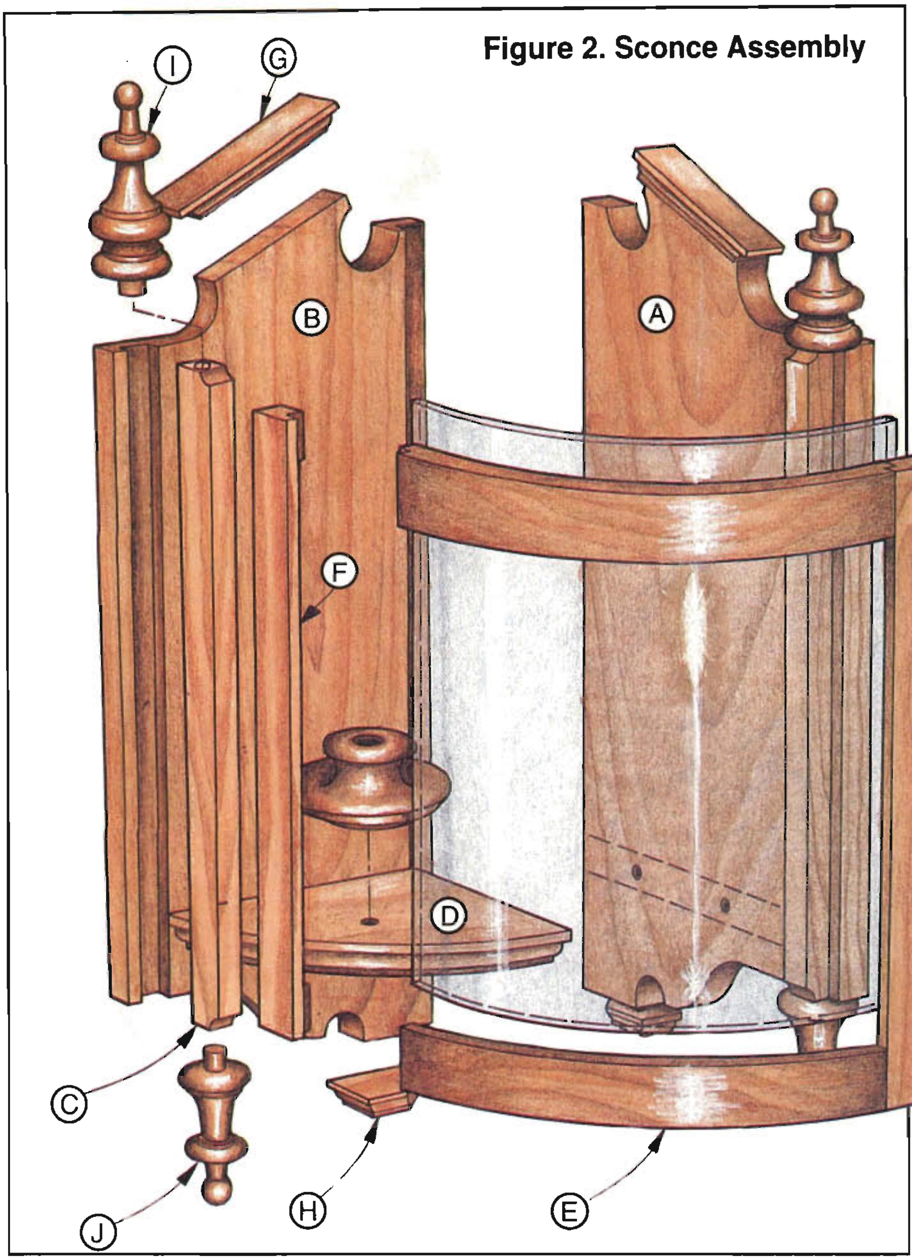
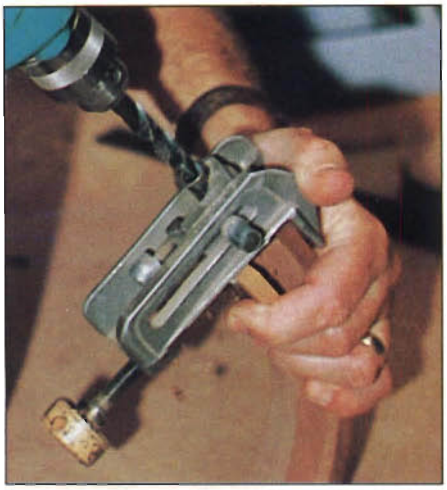
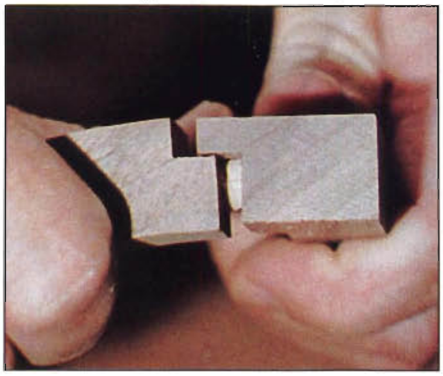


Figure 2. Sconce Assembly

Tom Larson and Ginny Pruitt


Use a drilling jig to locate and drill the dowel holes in the ends of the door bows.

An auxiliary fence on the miter gauge helps steady the bow while rabbeting the ends.


Dry fit the door bows and stiles together before starting the final assembly.

Band clamps work well when you're ready to glue the bows and stiles together.

Curved Glass Corner Wall Sconce

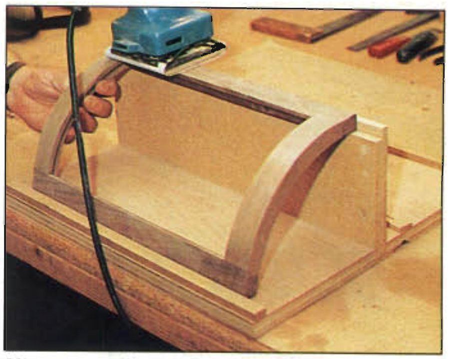
Cutting List

Qty	Part	Finished Size			Piece
		T	W	L	
1	A	¾"	7 9/16"	20 1/16"	right side
1	B	¾"	7 15/16"	20 1/16"	left side
2	C	¾"	31/32"	15 9/16"	side stiles
1	D	¾"	5⅝"	5⅝"	shelf
2	E	1¼"	2"	7⅛"	door bow blanks
2	F	¾"	1¼"	14½"	door stiles
2	G	9/16"	1 3/16"	4⅜"	crest mouldings
2	H	9/16"	1 3/16"	2½"	bottom mouldings
2	I	1¼"	1¼"	3⅝"	crest finials
2	J	1¼"	1¼"	2⅞"	drop finials
1	K	5/16"	15/32"	12⅝"	hinge–side glass stop
1	L	7/32"	11/32"	12⅝"	latch–side glass stop

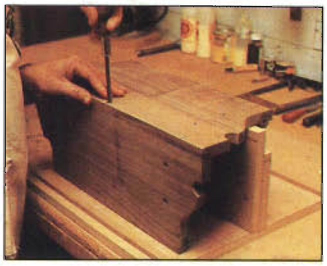
Supplies

2	hinges
1	magnetic catch
1	door pull
1	wall hanger
7	1½" X #10 wood screws
4	½" brads
1	7½" X 12½" glass bent on a 6" radius

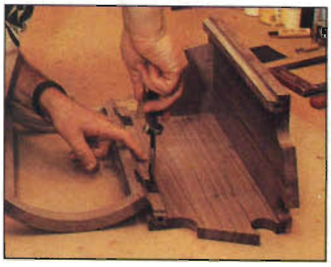
Recess the hanger so the sconce will hang flat.



You can make finish sanding the door frame much easier by constructing a jig to hold the work.



You can easily adapt the sanding jig in the top right photo to help in positioning the pieces for assembly.



Mortise the door hinges on the door itself; then attach the door to the hinge–side stile.

Ready the bows for assembly by cutting a rabbet on each end. I did this on the table saw using the miter gauge with a back–up board (bottom left photo, opposite page). The blade depth should match the 5/16" lip on the bow face. Set the distance between the fence and the outside of the blade to match the depth of the rabbet on the door stiles. With the end of the bow flush against the fence, make the first pass to set the cut and then clean out the rest with an additional pass or two. Dry fit after cutting the first end rabbet and make adjustments if needed.

You're ready to glue the door frame. Band clamps work well if you're careful not to pull the stiles either up or down from a tight joint. Note that the bows are slightly heavier than the stiles (center photo, opposite page). This lets you work down the bows once the frame is dry to the thickness of the stiles, making for a smooth joint without destroying the integrity of the stiles.

I used a drum sander to work the bows down to match the stiles. Once that's done, you can check the door for proper fit. After making any necessary adjustments, mount the hanger on the back and you're ready to assemble the sides, stiles and shelf (photos above).

Glue in the hinge and latch side stiles (C), and drill the finial holes. The shelf must have a space between its curved outer edge and the door bow so air can circulate around the candle in the finished sconce.

Final assembly, sanding and hardware fitting are easier if you use the jig shown in the photos above. Cut the crest and bottom mouldings (G and H), sand and secure them to the top and bottom edges of the side pieces as shown. The crest and drop finials (I and J) can be purchased from many local and mail order suppliers, but if you like those used here, set your calipers to the diameters on the patterns in the PullOut™ Plans and turn your own.

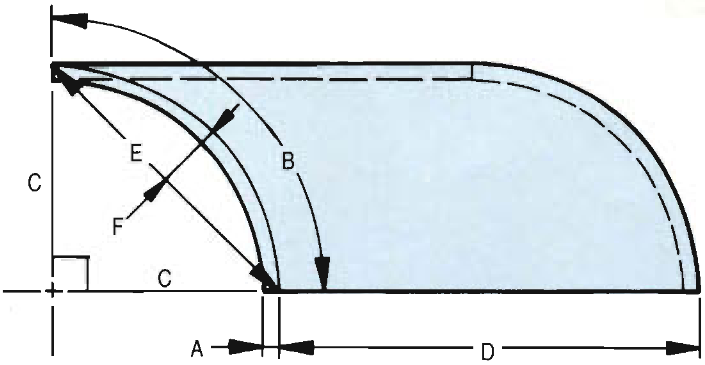
After you've mounted the hardware on the door frame, it's ready to hang. Cut the two glass stops (K and L), slightly round over one edge of each, and you're ready for the finish room.

If you can drive four small brads, you're qualified to install the curved glass panel after finishing. You can turn a wooden candle holder or buy any number of pre–made designs; I found a porcelain holder that works nicely.

Slip the curved glass into the door frame after you stain and finish the sconce.

Nail a glass stop (K and L) along each door stile to hold the glass in place.

Friendly Magic



Working with Curved Glass

by Rod Beemer

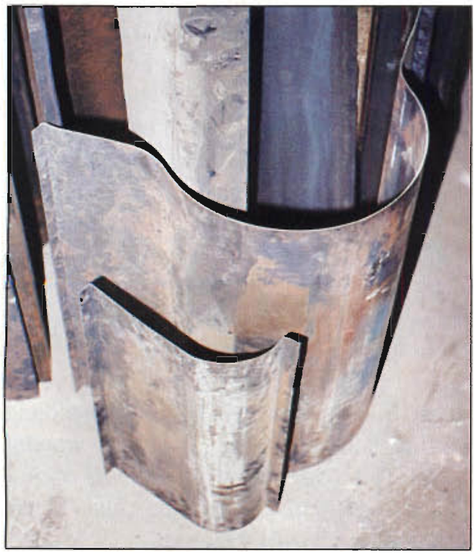
Does it take magic to work with curved glass? Many of my customers and fellow woodworkers think it does. Actually, curved glass is more "user–*friendly*" than you might think. The *magic* comes from the appearance—the beauty of curved glass can add to a furniture design.

If grandmother's old oak china cabinet needs new glass or if you've just thought about using curved glass in a furniture design, take heart. Contrary to popular belief, glass bending didn't disappear with hoop skirts and whalebone corsets. You can get quality curved glass from many reputable sources today. So dig out the old china, or go ahead with plans for a curved glass furniture piece. You can master the craft of working with curved glass.

Curved glass appears in furnishings as early as medieval times and was in wide use by the mid–1800's. Pieces from France, French Canada, Spain, England and the United States reflect its use in furniture design over a century ago. The process of bending glass was basically the same then as it is now. To produce a piece of curved glass a flat sheet is placed in a mold of the desired radius. The mold and glass are then heated in a kiln until the glass becomes soft and sags to conform to the shape of the mold. The process requires temperatures of 1000° to 1200° Fahrenheit. Molds are generally made of metal, clay or ceramics. Once the glass conforms to the mold, it's cooled slowly to avoid becoming brittle. If the process is done properly, the resulting curved glass has the same properties as the original flat sheet.

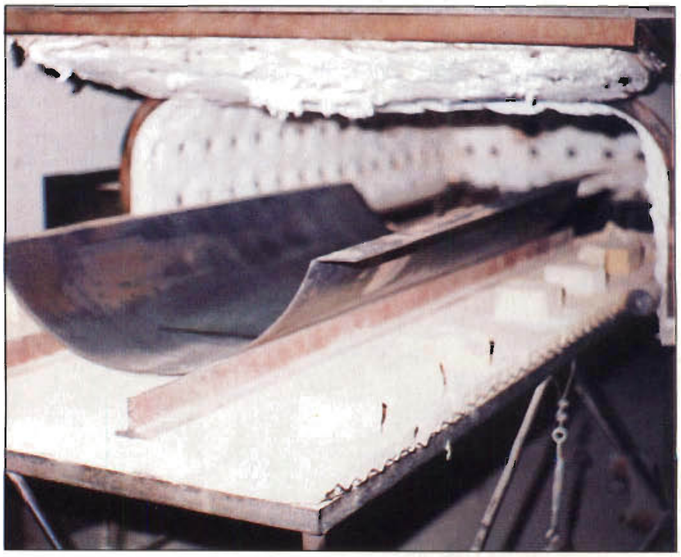
Much of the old glass found in antique pieces has a rippled appearance. This same effect can be reproduced in glass bent today, making it possible to match the original glass. Single– and double–strength common float glass is generally bent for curved glass used in furniture. Single–strength glass is 1/16" thick and double–strength glass is 1/8" thick.

***Rod Beemer's** shop, Furniture Art, is located in Salina, Kansas.*

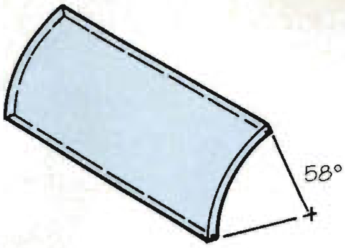


Many local companies, like Hopcroft Stained Glass Studios in Kansas City, as well as those listed on page 68, can supply a variety of glass bends. Two special molds are shown to the left.

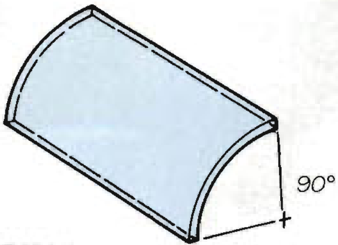
author



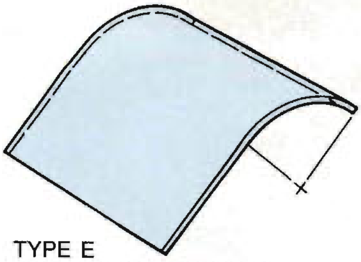
At right, a flat sheet of glass lies in a metal mold before entering the kiln.



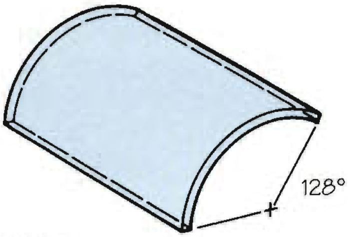
TYPE A
Shallow cylindrical bend;
curve not to exceed 58°



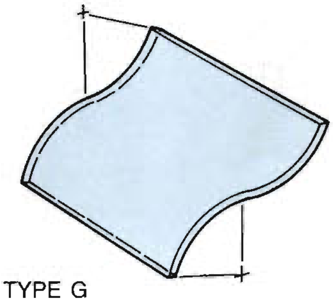
TYPE B
Cylindrical bend;
curve exceeds 58° but not 90°



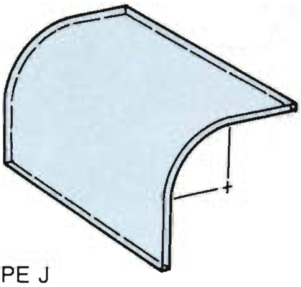
TYPE E
Curve plus a tangential flat



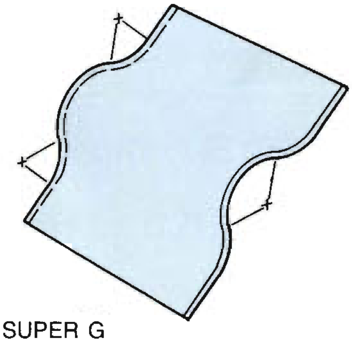
TYPE F
Curve exceeds 90° but not 128°



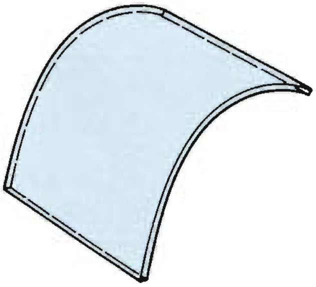
TYPE G
Double or triple reverse curves



TYPE J
Tangential flat, plus curve, plus tangential flat



SUPER G
Triple reverse curve with tangential flat(s)



IRREGULAR CURVE
No true radius

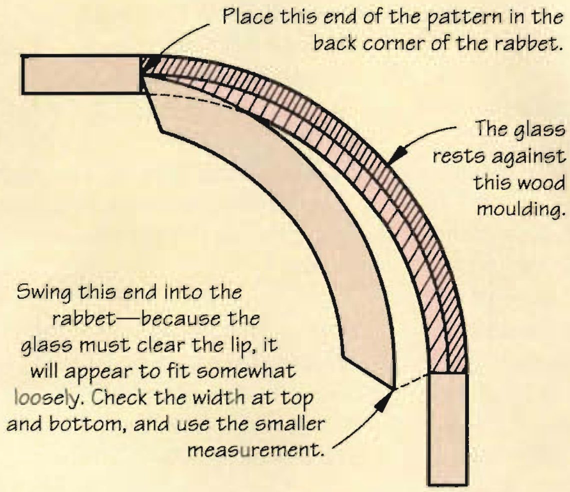
Ordering Bent Glass

When requesting a price quote, supply a tracing or sketch of the curve showing as many of these dimensions as possible (see the Figure on the opposite page):

(A) Glass Thickness
(B) Outside Girth
(C) Outside Radius
(D) Height or Length
(E) Outside Chord
(F) Outside Depth

Glass with tangential flat sections must include the length of the flat sections.

Based on information supplied by
Standard Bent Glass Co., Inc., Butler, PA

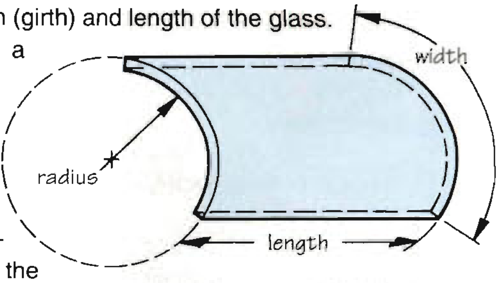

Place this end of the pattern in the back corner of the rabbet.
The glass rests against this wood moulding.
Swing this end into the rabbet—because the glass must clear the lip, it will appear to fit somewhat loosely. Check the width at top and bottom, and use the smaller measurement.

Fitting The Curved GlassTemplate

Tom Larson

Determining Glass Size

Whether planning for a new project or replacing curved glass in old furniture, the first step is to determine the size you need. When ordering curved glass the supplier must know three dimensions: the radius, width (girth) and length of the glass.



If you're replacing a broken piece with one end still intact, stand the glass on a piece of paper and trace around it. The tracing and the length dimension will be enough for the supplier to determine the radius and width you need. Unfortunately, the glass usually breaks in a way which prevents you from obtaining a tracing. If this is the case, cut a template from some posterboard to fit in the bow. Make certain that your pattern has the proper width as well as radius. It should fit easily between the stiles. When measuring length, allow ⅛" less than the actual opening. This is essential to avoid binding during installation.

An ordinary straightedge such as this metal yardstick is all you need to lay out the line for cutting the glass to width.

Pull the cutter toward you; and once you've started, don't stop until you've run off the edge.

When designing a new piece of furniture, keep in mind that most suppliers consider a glass size of about 24" X 52" the largest standard size. Other larger sizes are available upon special request. When I interviewed Standard Bent Glass, they were in the process of bending a 102" X 120" sheet. This company is limited only by the size of sheet glass that can be manufactured. Of course, expect to pay more for custom bends and larger sizes.

As a rule, the standard radius bends begin with 6" and increase in increments of ½". However, as with size, a nonstandard radius can be matched on a custom order. The Figures show many other

Where To Buy Curved Glass

All of the glass suppliers listed here report excellent success in shipping curved glass anywhere. Most standard–size glass goes UPS. Large numbers of panes and unusually large sizes may require freight line shipping. Either way, it will get to you without damage almost 100% of the time. Do expect to pay a modest charge for boxing or crating.

It is my policy to insist that delivery people remain at the shop until I've uncrated and inspected the glass so they can make a notation on the freight bill if damage has occurred. This may not please the driver, but it's essential if you wish to collect any damage claim due to breakage in shipping.

The following companies can supply you with curved glass and accessories:

Hopcroft Stained Glass Studios, Inc.
5810 Quincy Avenue
Kansas City, Missouri 64130
Tel. 816-363-5810

Hopcroft has been in business since 1914 and can supply standard curved glass plus many custom bends such as serpentine. Prices are on a per job quote.

Van Dyke's
P.O. Box 278
Woonsocket, South Dakota 57385
Tel. 605-796-4425/fax 605-796-4085

Van Dyke's maintains a large inventory of standard curved glass and 95% of orders can be filled within a few days. They also offer other items used in working with curved glass such as wooden bows and rails.

Standard Bent Glass Company, Inc.
P.O. Box 469
Butler, Pennsylvania 16003-0469
Tel. 412-287-3747

Standard Bent Glass has been bending glass since 1914. They can provide curved glass for furniture pieces as well as all special bends. They are a world–wide leader in architectural bent glass. Due to the highly custom nature of their product, they don't publish a price list. However, their customer service representatives can provide same–day price quotation on a per job basis.

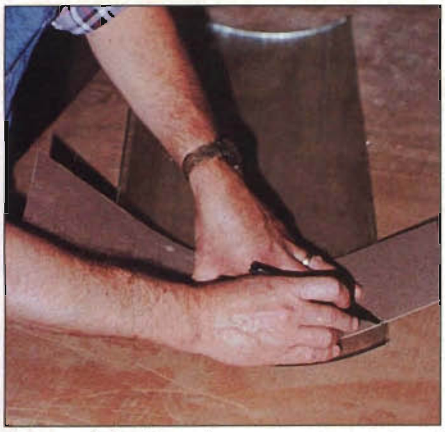
Blair Glass
P.O. Box 484
Blair, Nebraska 68008-0484
Tel. 402-426-4711/fax 402-426-4712

Blair maintains a large inventory of standard curved glass, and can provide special bends by quote only. They do publish a price list for standard bends which is available upon request.

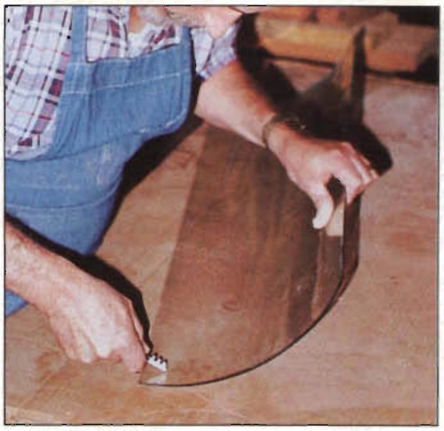
California Glass Bending
320 East B Street
Wilmington, California 90744
Tel. 310-549-5255/800-223-6594
fax 213-549-5398

California Glass Bending is a reliable supplier of standard curved glass as well as special bends. Prices are on a quote–only basis.

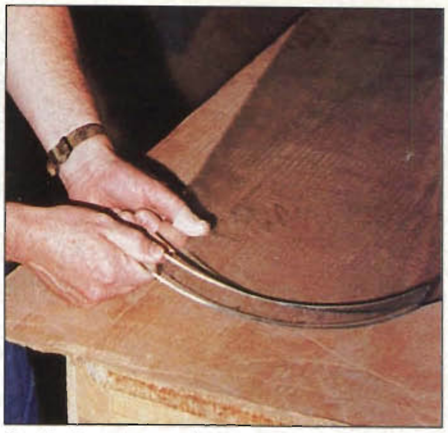
Order glassworking tools from:
Woodworker's Supply, Inc.
5604 Alameda Place, NE
Albuquerque, New Mexico 87113
Tel. 505-821-0500



Use a felt–tipped pen and a strip of posterboard to mark the length of the curved glass panel.



Roll the glass away from you so the point where cutter meets glass firmly contacts the bench. Push the cutter along.

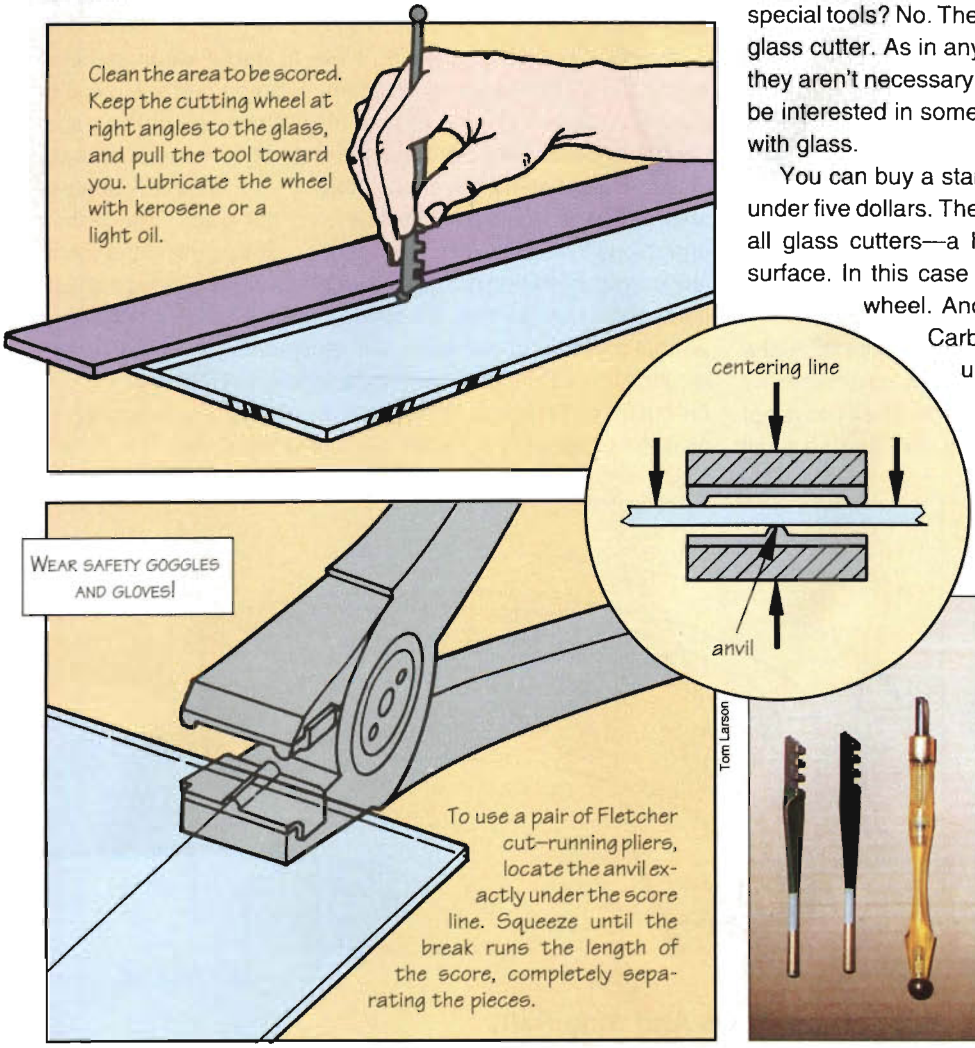


Grab the glass edge on each side of the score and "fold" the glass sharply downward for a good, clean break.

bends that are available. Although 1⁄8" is the standard thickness, glass up to 1" thick can be successfully bent. Before proceeding with a project design that requires special glass sizes and bends, however, check with the supplier to be sure they can provide what you need. All special sizes and bends are by quote only, so check around before ordering.

Cutting Curved Glass

People believe that curved glass is especially fragile and are often reluctant even to touch it, much less cut a piece. Quite the opposite is true of good curved glass. In fact, it is no different than dealing with a piece of good flat glass. You can carry it, box it, ship it, stand it up, lay it down and even get a little rough with it, and it won't self–destruct. I handle it with the same reasonable amount of care any glass deserves, but I don't baby it. As long as the surface integrity of glass is maintained, it resists breakage under normal handling. In other words, don't scratch or score it during handling and storing.



Clean the area to be scored. Keep the cutting wheel at right angles to the glass, and pull the tool toward you. Lubricate the wheel with kerosene or a light oil.

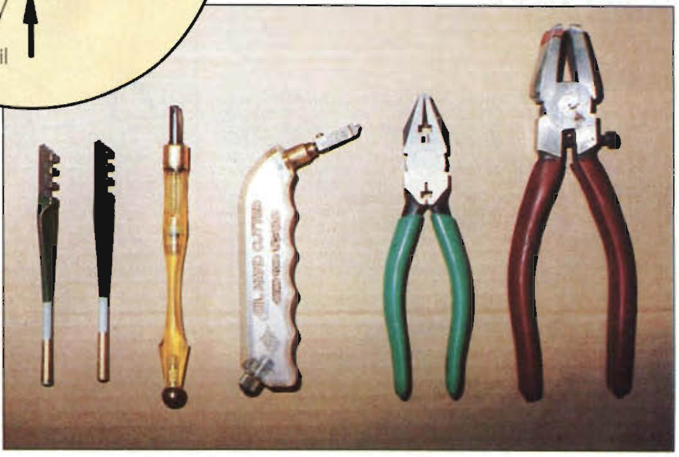
WEAR SAFETY GOGGLES AND GLOVES!

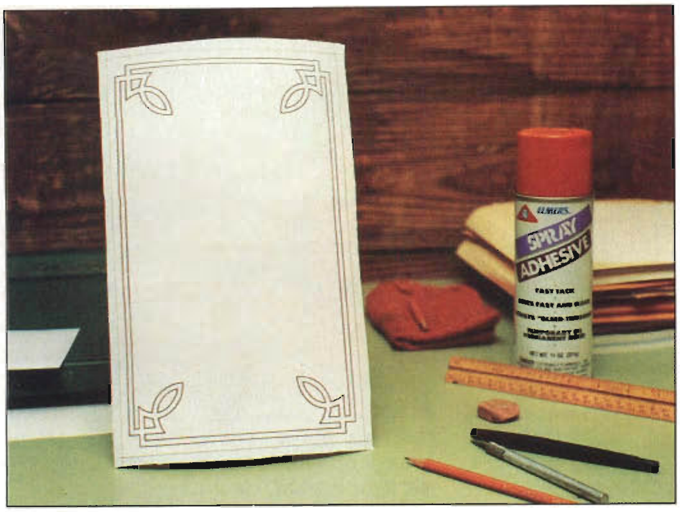
To use a pair of Fletcher cut–running pliers, locate the anvil exactly under the score line. Squeeze until the break runs the length of the score, completely separating the pieces.

Does it take special skills to cut curved glass? No. The ability to hold a cutter and follow a line will just about do it. How about special tools? No. The only tool that you really need is a standard glass cutter. As in any craft, there are specialty tools made, but they aren't necessary. But if you're a tool freak like me, you may be interested in some of the special ones available for working with glass.

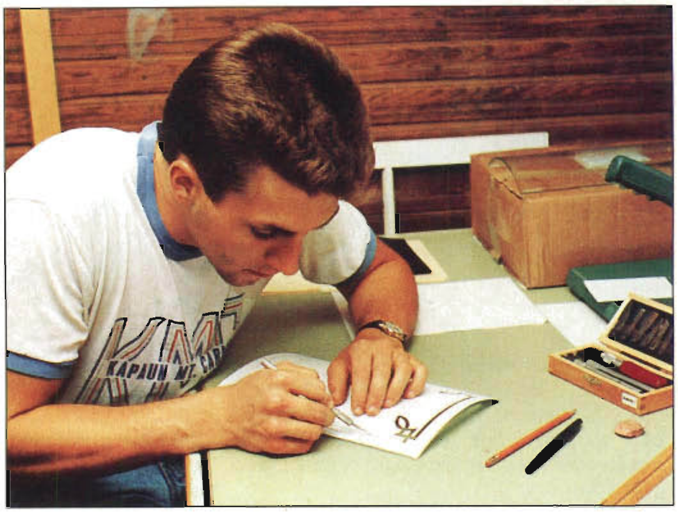
You can buy a standard glass cutter at a hardware store for under five dollars. The principle behind this cutter is the same for all glass cutters—a handle with a device to score the glass surface. In this case the scoring device is a small, hard steel wheel. Another version has a carbide cutter wheel. Carbide is much harder and holds up longer under rugged use. Most people I've talked to say they get just as good a cut with the standard steel cutter. Unless you're planning to do a great deal of glass cutting, the carbide isn't necessary.

A variety of specialized tools are available for cutting and working with glass.





Here's a simple border pattern that you can easily etch into a piece of curved glass.



After drawing the design on contact paper and adhering it to the glass, cut out the parts you want etched with an X–Acto knife.

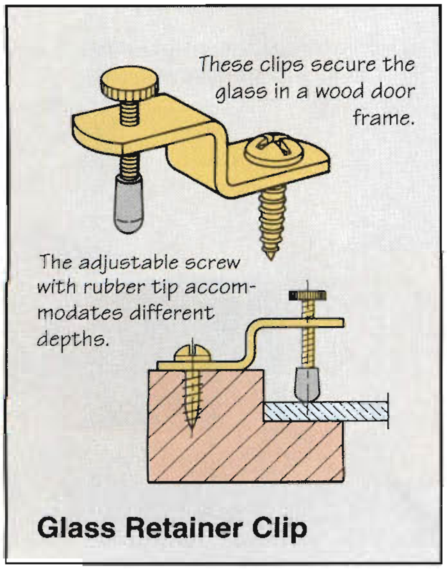
Once you've cut out the design, you're ready to etch it in.

The job is made easy by using an inexpensive sandblaster.

When cutting glass, always lubricate the cutter with kerosene or a light oil. You can buy a steel wheel cutter with an oil reservoir in the handle—handy if you're making many cuts. But if you're not using a self–oiling type, place some kerosene or light oil in a small container and dip in the cutter before each cut. Pistol–grip cutters with an oil reservoir are also available. Though the design is different, the operating principle is the same.

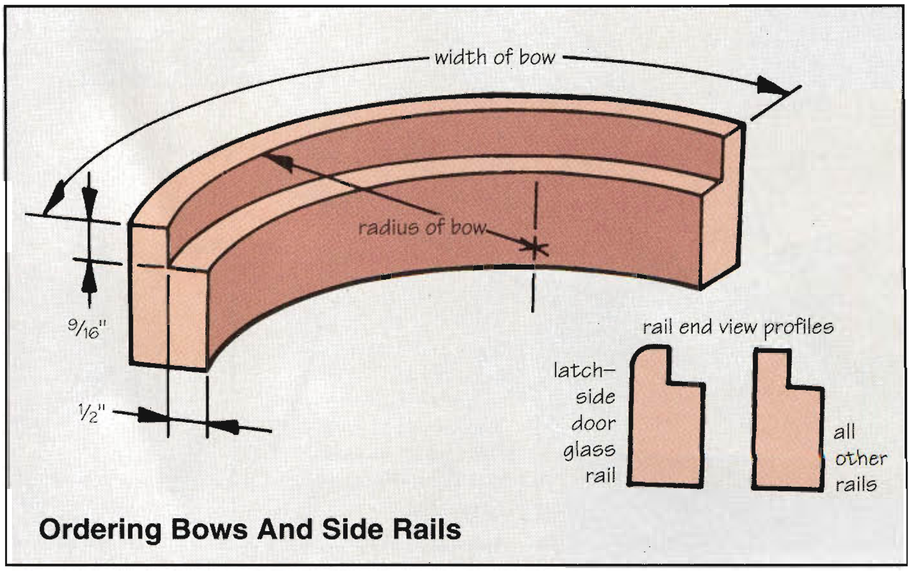
Other tools include **agrozer pliers** (see the photo on the previous page) which are used to clean up cuts that don't run cleanly. They're handy, too, if you need to trim off a small amount such as ⅛". I've also used plain old pliers for nibbling edges. Another tool, cut–running pliers, can be helpful but they're not essential.

During the cutting operation I like to use a clean piece of cardboard on the top of my workbench. Some prefer a piece of carpet. What you want is a clean, non–abrasive work surface. Clean the glass of any dirt or foreign material and you're ready to mark out the dimensions on the glass. If you've never cut glass before, you may want to practice on a flat piece. The cutting principle is the same. You make most cuts by pulling the cutter toward you, but when cutting across the curve of a curved sheet, it's best to push the tool. If it needs to be cut both to length and width, I prefer cutting to width first, then across the curve for the length. I use a felt–tipped pen and a simple straightedge to mark the cut down the length of the glass. A strip of posterboard works as a straightedge to mark the cut across the curve.


These clips secure the glass in a wood door frame.
The adjustable screw with rubber tip accommodates different depths.

Glass Retainer Clip

Tom Larson



Ordering Bows And Side Rails

For your practice cuts, don't worry about perfect straightness—that will come with practice. Concentrate on applying the correct amount of pressure. Oil the cutter and place it on the glass with about the same amount of pressure you'd use to cut cardboard with a razor knife. A lot of pressure is not necessary. As you pull the cutter across the glass you should hear it "sing" continuously. If you hear a grinding sound or notice small chips of glass pop from the cut, resulting in a ragged score line, you're applying too much pressure. Once you start the cut, don't stop until you run off the edge of the glass and don't try to go over it a second time.

After you've scored the glass, grab the edge on each side of the score and "fold" the glass sharply downward. It should break clean. This is where a pair of cut–running pliers can be useful. *Always wear safety glasses when working with any kind of glass.* Some people feel more comfortable wearing a pair of gloves during the "folding" step. Don't get discouraged if your cuts sometimes refuse to break cleanly—even the pros don't always get it perfect. Remember to oil the cutter between each cut and keep all glass chips and slivers off your work surface.

Once you've made a few successful practice cuts, you've mastered the basic cutting technique and are ready to cut a piece of curved glass. Keep in mind that the point where the cutter contacts the glass must always be solidly backed up. As you run the cutter across the concave side of the curved surface, roll or tip the glass so that the cutting wheel bears down on the glass firmly and continually against the bench top. With a little practice this is easy to master.

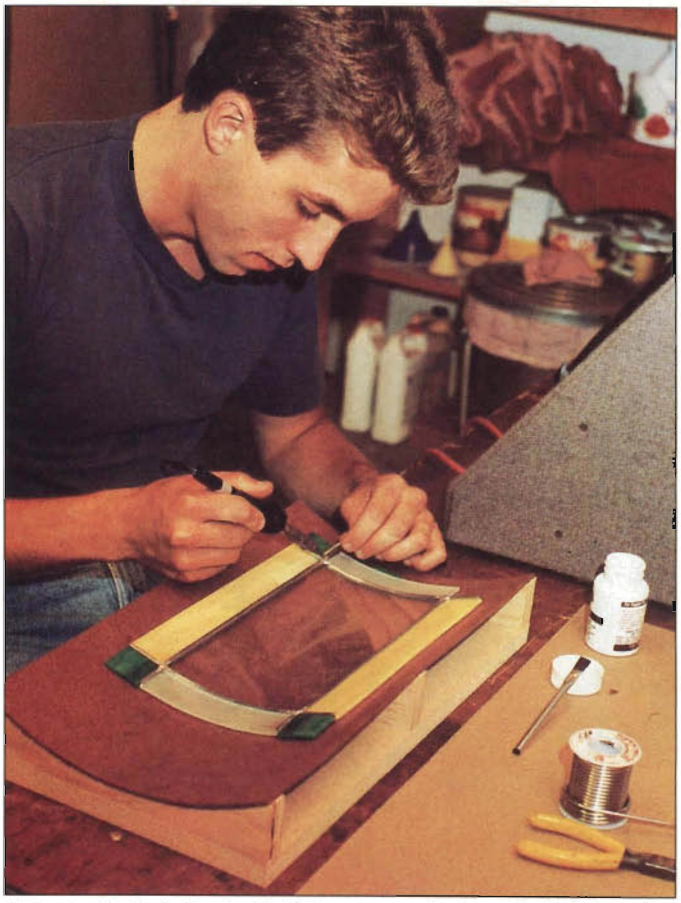
Getting Fancy

Curved glass adds another dimension to furniture design without any extra embellishment, but if you want to give it a personal touch, here are a few artistic treatments you can try.

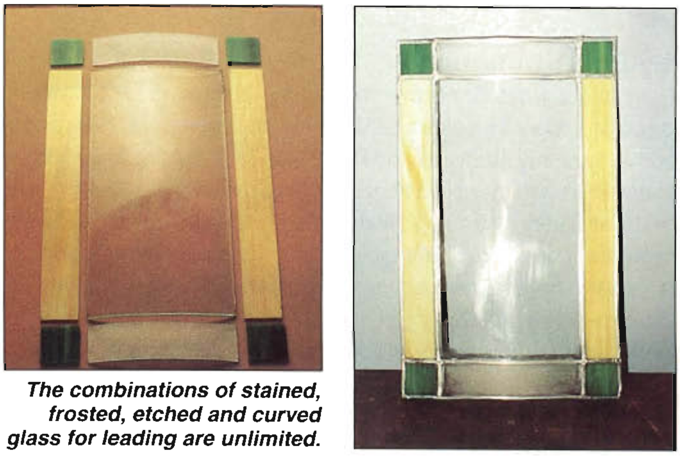
Etching offers the opportunity to personalize a project with initials, family crests or any design that strikes your fancy. Once you have the artwork for your glass, make a few photocopies. This is especially useful if the design incorporates repeated patterns, and it provides a record of your design for future use.

Begin by covering the entire face of the glass with self–adhesive contact paper. Glue the pattern or design in the proper location directly onto the contact paper. I've found that spray adhesive works best for this step. With a sharp hobby knife or razor blade, cut out the design you want etched into the glass (see the photo above left). I do all my etching with a sandblaster using fine to medium grade sand at 40 to 50 pounds of line pressure. Move the gun evenly over the design, blasting the glass until it's frosted to your liking. Then simply remove the contact paper. If you don't have the equipment, many commercial sandblasting companies will do it for you if you have the glass prepared when you take it to them.

Leading a piece of curved glass is another special treatment that adds your personal touch. It's not too difficult for anyone used to working with their hands—such as woodworkers. Because the glass is curved, you will be somewhat limited in design. Stained glass does not come with a radius bend, but narrow strips can be leaded in at the edges and still maintain the curved effect. Small pieces across the top and bottom add color and texture, and are easy to install. You can also etch or frost sections of the curved glass itself, and then lead them into the piece. When figuring the size of the glass and cutting pieces for a specific opening, keep in mind that the lead caming does add width and length to the completed piece. Allow for this extra before you start. Another concern when leading curved glass is holding the pieces in place while you're working. I've found that a simple jig (photo) works very well and isn't difficult to make.



This simple jig helps hold all the pieces of glass and lead caming together during the leading process.



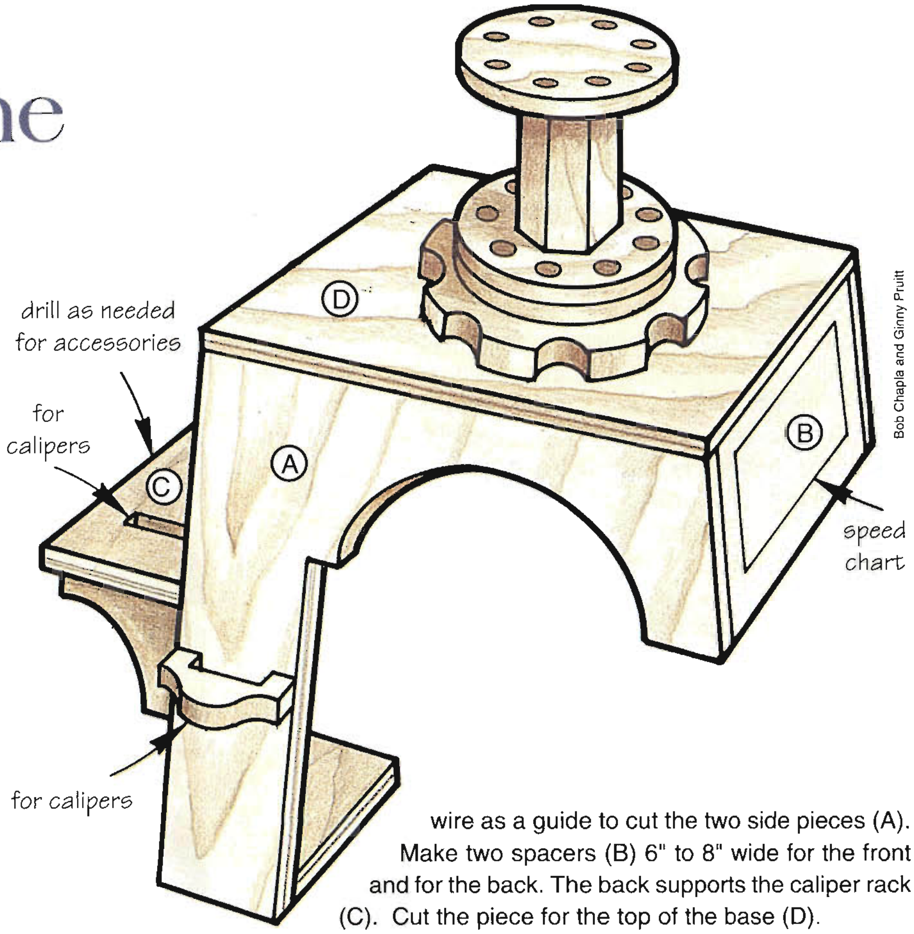
The combinations of stained, frosted, etched and curved glass for leading are unlimited.

The techniques of stained glass and leading are outside the scope of this article, but many craft books are available that give good step–by–step instructions. If you can cut glass and operate a soldering tool, you can create a striking piece for your woodworking project.

I have had my share of frustrating moments working with curved glass. But when I deliver a finished piece of furniture and see how it transforms a room—and hear the compliments of a satisfied customer—I realize again that I'm hooked on the friendly magic of curved glass. PW

Handy Lathe Tool Rack

Bruce Richmond



Bob Chapla and Ginny Pruitt

by Don Kinnaman

It has always been my philosophy to make a woodworking shop as accessible as possible for my students. Over the span of forty years, my students and I tried several ideas for storing lathe tools. We hung them in a tilted rack near the tailstock, but this was just not handy. We tried having them in pockets just below the lathe bed, but it was difficult to differentiate between a gouge or a skew, and the pockets were constantly filling with dirt. The carousel idea came to mind about twenty years ago and was not only used for our school lathes, but was copied by Arizona State University, Northern Arizona University, and a host of junior and senior high schools in the Phoenix area. Some of the advantages of the lathe tool carousel are that the tools are close at hand, it's easy to see if any tools are missing, and it can be labeled to indicate where each tool goes. The carousel can be made from scrap plywood or whatever is at hand to fit any industrial or home lathe. The base of the carousel provides space for other tools such as calipers, a spanner wrench, take–up bolt, and so on.

Making the Base

First, make the base unit from a good grade of plywood, such as 3/4" birch. The base and carousel are entirely dependent on the size and shape of your lathe and the number and size of your tools. Refer to the Figure above for guideline dimensions as you construct this project. Take a long piece of wire or solder and bend it to conform to the shape of the headstock on your lathe. Use the wire as a guide to cut the two side pieces (A). Make two spacers (B) 6" to 8" wide for the front and for the back. The back supports the caliper rack (C). Cut the piece for the top of the base (D).

A brace and thumbscrew may be needed to secure the base unit to the lathe. The sides conform to the lathe well—nothing is really needed here to hold this all in place— but for peace of mind you can add a brace and thumbscrew anyway. Soften all the edges and finish with lacquer or urethane. Screw or nail the base unit together with glue in the joints.

Carousel Construction

Most lathe tool sets include a 1" gouge, ½" gouge, ¼" gouge, 1" skew, ½" skew, bullnose or ½" roundnose, parting tool and ½" diamond point—a total of eight chisels. You may have more than this—or plan to add to your collection—and the carousel will have to be made large enough to accommodate all your tools.

The carousel top (E) and two tool bottoms (F) are 6" in diameter and are made of 3/4" stock. If you want your carousel to hold more than eight tools, allow 2 1/4" of circumference per tool. Lay out evenly spaced holes in the top to accommodate the chisels. Double up the top and one bottom and bore them at the same time, unless you want to make the holes in the tool bottom smaller to accommodate the 1/2" wide chisels. Our chisels have a 1" ferrule and the holes in the top were bored to fit these. After drilling the holes in one of the bottom pieces, glue and nail it to the solid bottom.

Make the spacer block (G) from a piece of 4 X 4 between 4" and 5" long, depending on the length of your chisel irons. Use a V–block on your bandsaw to cut the corners off the 4 X 4 to form an octagonal shape.

Using a router with a roundover or chamfering bit, chamfer both sides of all the holes in the top and bottom slightly. Drill a reference hole in the center of the carousel top, tool bottom,

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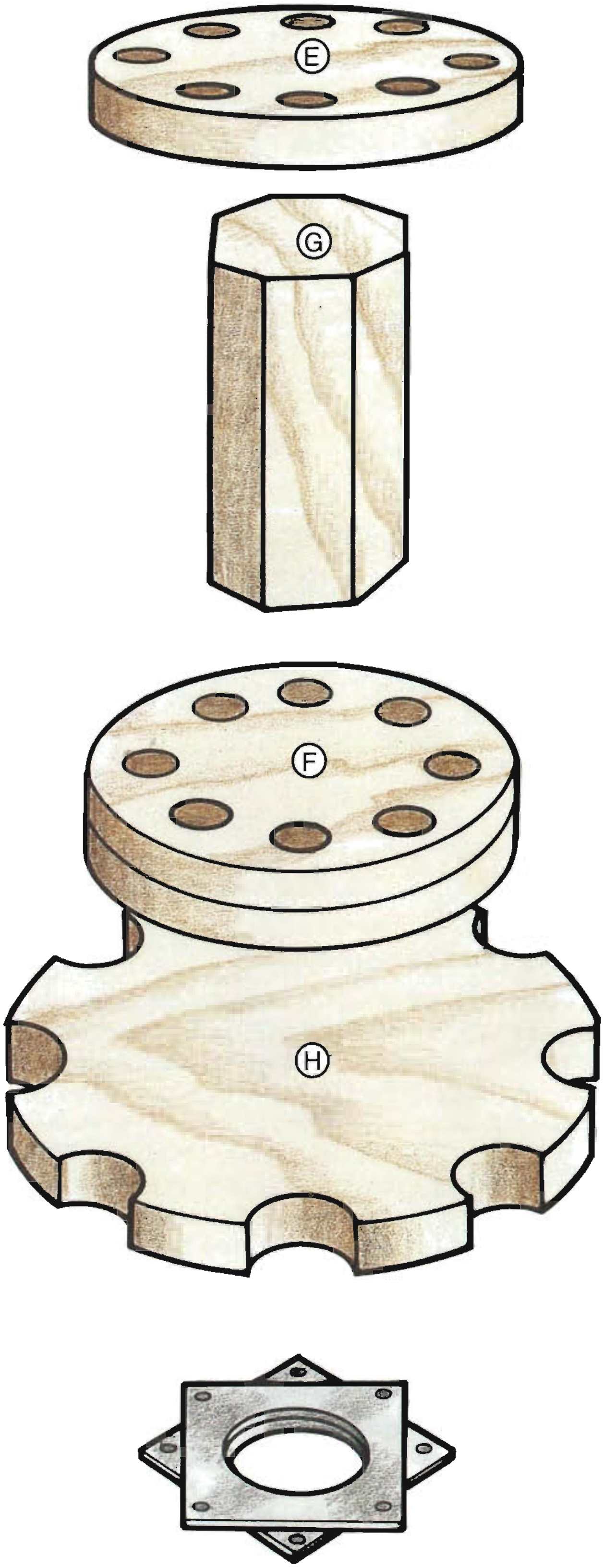
***Don Kinnaman** is a retired high school woodshop teacher from Phoenix, Arizona, and a frequent contributor to* Popular Woodworking.

The Carousel Assembly



Bob Chapla and Ginny Pruitt

Lathe Speed Guide

Diameter	Roughing Cut	Shaping Cut	Finishing Cut
Up to 2"	910 rpm	2590 rpm	4250 rpm
2" to 4"	810 rpm	2375 rpm	3380 rpm
4" to 6"	650 rpm	1825 rpm	2375 rpm
6" to 8"	650 rpm	1200 rpm	1825 rpm
8" to 10"	650 rpm	910 rpm	1025 rpm
over 10"	650 rpm	650 rpm	650 rpm

Sources

Here are some mail-order sources for the swivel mechanism just in case your local hardware store can't get them:

Constantine's
2050 Eastchester Rd.
Bronx, NY 10461
1 (800) 223-8087

The Woodworkers' Store
21801 Industrial Blvd.
Rogers, MN 55374-9514
1 (612) 428-2199

Trend–Lines
375 Beacham St.
Chelsea, MA 01250
1 (800) 767-9999

Woodworker's Supply
1108 North Glenn Rd.
Casper, WY 82601

Woodcraft
210 Wood County Industrial Park
P. O. Box 1686
Parkersburg, WV 26102-1686
1 (800) 225-1153

spacer block and turntable (H) so that everything aligns properly when put together. Line up the ferrule holes with the blade tip holes as you assemble the carousel.

The turntable starts out as a disk 8" in diameter. Lay out eight evenly spaced holes around the perimeter, then drill a 1" hole at each position with the holes just touching the outside edge. When finished, cut around the the base through the center of each hole so that you have eight half circles. Finish as you did the rest of the carousel.

Mount a small lazy susan on the top of the base unit after the entire carousel is assembled. Rotate the top of the lazy susan, then mark and drill an access hole so the screws into the upper half of the lazy susan can be secured to the underside of the turntable. Revolve the carousel until all four screws are placed correctly. Use a label maker to mark each hole for the tool that will be stored there. Wrap the edge of the carousel top with plastic colored tape and place the labels on this contrasting base.

The front spacer is a good place to list turning speeds or other useful information. It's a good idea to constantly review speeds versus diameters to be safe on the job, even at home, so type this information out on a 3" X 5" card, attach it to the spacer, and cover it with a piece of clear plastic. PW

A Popular Woodworking Project

Tambour Planters

by Robert M. Colpetzer

Before you take those empty plastic containers to the recycling center, take a good look at them. There may be a project among those empties just waiting to be discovered. That's *exactly* what happened while I was packing up some empty plastic containers. My wife had asked me to make some wooden planters for her, but I'd been hesitant to begin the project because I needed a liner that would protect the wood from the moisture in the potting soil.

Pondering over all the different–sized containers, I decided to develop a planter that used a tambour assembly for the sides. Having built tambour doors before, I knew that I could bend the tambours around some pretty tight curves. After a little thought, I determined there were several ways to make the planters depending on the shape of the container and the tools available. I'll give you two ways to proceed and present some ideas to help you make planters from shapes not shown here.

Although the planters can be made from many types of wood, I chose Western Red Cedar. It is readily available in my area and provides a neutral color when a clear finish is applied.

***Robert Colpetzer** is a woodworker in Clinton, Tennessee.*

Round Planter Cutting List

		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
2	A	$\frac{3}{4}$"	8"	8"	top and bottom
26	B	$\frac{1}{4}$"	$\frac{3}{4}$"	7$\frac{3}{4}$"	tambours
1	C	$\frac{3}{4}$"	$\frac{3}{4}$"	7"	feet (4)
1	D	6$\frac{1}{8}$" dia. container			liner

Making The Tambours

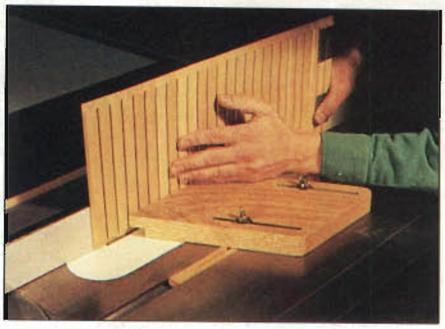
To completely encircle a 6$^1/_8$" diameter gallon jug, you need twenty–six $^3/_4$" wide tambour strips. From a piece of stock $^3/_4$" X 7" X 17", rip thirteen strips $^3/_8$" wide. It is important to note that your stock for the tambours must be exactly $^3/_4$" thick; any variation will throw off the dimensions on the drawing. Plane the strips to $^1/_4$" to remove the saw marks from each side. Line the strips up edge to edge and belt sand the face to remove any machine marks. I found that removing the machine marks before proceeding is easier—later, these pieces are cut fairly short. Use a shaper or table–mounted router to round over an $^1/_8$" radius on the face edges of each strip. Finish sand the shaped edges and face before cutting the strips to a rough length of 8".

At this point, you could glue the tambour strips to canvas fabric, as you would for a conventional tambour door. But since these tambours are glued in place and won't move, they only need to be held together long enough to be positioned. The inside of the tambour strips are covered by the plastic liner and won't show. Position the strips snugly, edge to edge, face down and apply two strips of 2" duct tape. This holds the strips together

author

Use duct tape to hold tambour strips together for sizing and rabbeting.

Trim the rough assembly to width on the table saw.



Use a featherboard to assure accuracy when cutting the rabbet in the tambour.

securely until they're in position to glue to the top and bottom. Allow the duct tape to extend 2" beyond the ends for fastening later.

Trim and cut the tambour assembly to 7¾" on the table saw. While you're still at the table saw, set up and cut a rabbet on both ends of the tambour assembly to form a 5/32" X 3/8" tongue. I used a feather board to hold the tambour tight against the fence while making the cheek cut of the rabbet.

Form the tambour assembly into a circle and tape it together using the tab left earlier. You should now be able to slip a gallon jug inside the circle.

Making The Top And Bottom

Cut two pieces of ¾" Western Cedar 8¼" X 8¼". Find the center of each square by drawing diagonals from corner to corner. Use a compass to lay out an 8" circle on both squares. Cut out each circle on the bandsaw—stay to the outside of the layout line.

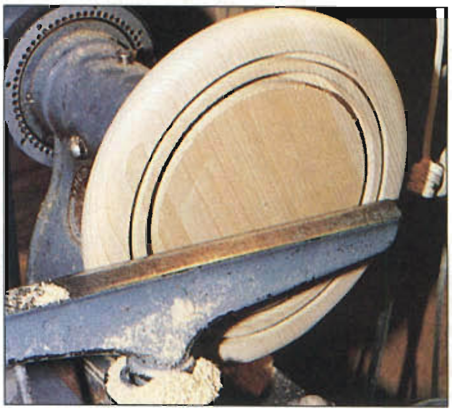
Affix a lathe screw–chuck to the center of one of the disks; then fasten the chuck and the disk to the lathe. Turn the disk to an 8" diameter; then turn a ¾" bead on the edge.

From the center of the disk, lay out the radius of the slot according to the dimensions given in Figure 1. It is important to note that before you cut the slot, form the tambour around the gallon jug and check the diameter so you don't position the slot incorrectly.

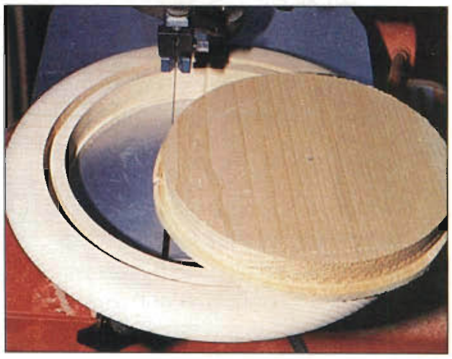
Use your parting tool to cut a 3/16" X 3/8" deep slot inside the layout mark. I suggest that when you part the slot, make the cut only 1/16" deep. Turn off the lathe, wrap the tambour around the jug and test for fit. Cut the slot to full depth, sand the disk, then remove it from the lathe.

Mount the second disk on the screw–chuck and turn it exactly as you did the first one. Since this one will be the top, you need to remove the center. From the center mark, lay out the diameter of the cutout from the dimensions given in Figure 1. Use your parting tool to cut a 5/8" deep groove. Do not cut completely through. Sand the disk as before, then remove it from the chuck. To remove the center of the second disk, drill an 1/8" hole in the groove and insert a scroll saw blade through the hole, reattach the blade, then saw around the parted groove to remove the center.

With a 3/8" round over bit, rout the top edge of the hole to remove excess material, and sand.



Use a parting tool to cut part way through the lid. Finish the cut with a scroll saw.



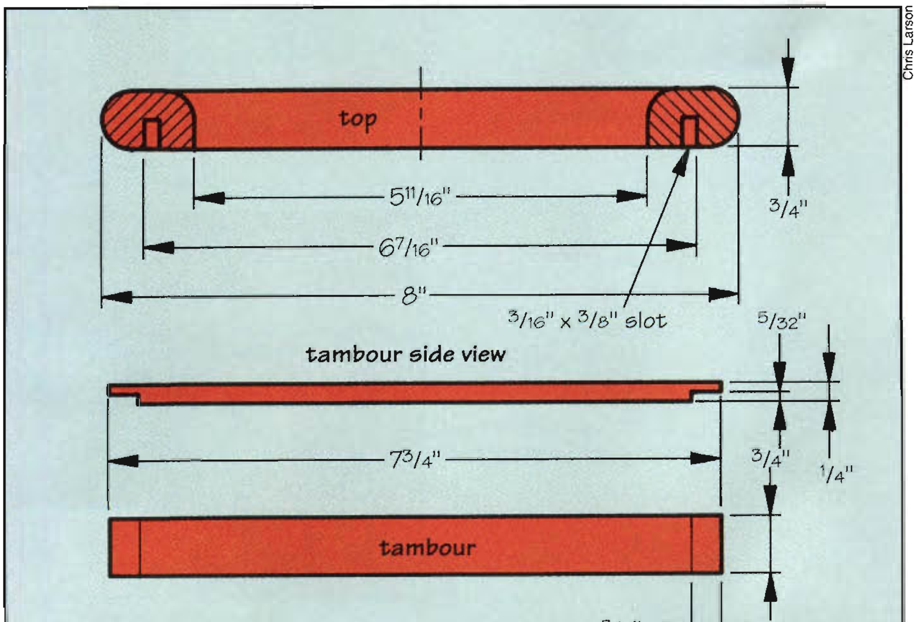
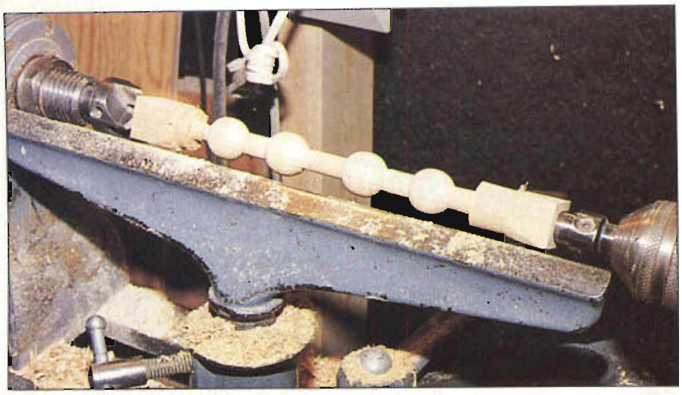


Figure 1. Tambours and Top

Chris Larson



Turn the four feet from one piece of wood; then cut them apart and finish individually on the lathe.

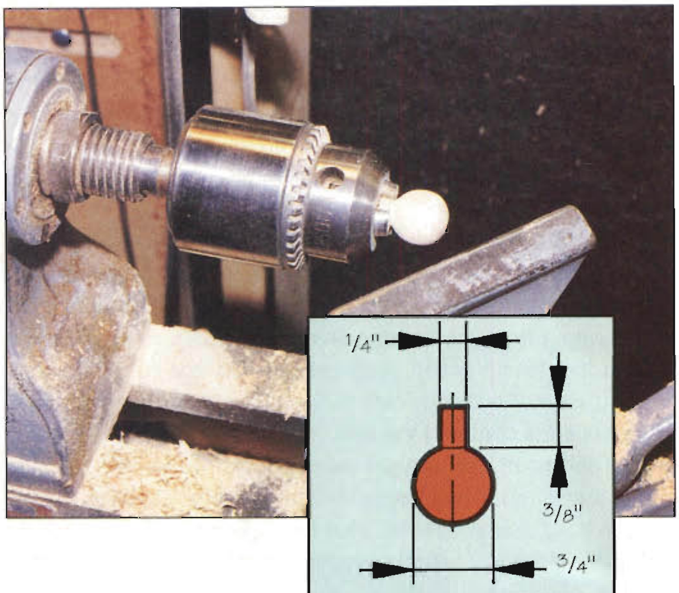


Figure 2. A Foot

The Feet

Chuck a 3/4" X 3/4" X 7" piece of wood between centers in the lathe and turn the four feet like the one shown in the above Figure. Turn all four of the feet on one blank then cut them apart. Chuck each one individually and finish turn the bottoms to make a round ball.

Layout the position of the feet on the bottom disk. Equally space them 3 3/8" from the center. Locate their positions and drill four 1/4" X 3/8" deep holes.

Assembly

Cut the top from a gallon plastic jug so the resulting container is 7" tall. Dry assemble all the parts and make any adjustments. Any height of planter can be made, just make the plastic container 3/4" shorter than the full length of the tambour strips.

Glue all the parts together. Make sure you install the plastic liner before you glue on the top. When the glue is dry, unclamp then remove the duct tape. Sand all the parts with 150–grit paper and clean up any glue stains. Remove the dust with a vacuum, tack rag or compressor. For a superior gloss finish, apply one coat of sanding sealer followed by two coats of exterior varnish. Scuff sand between coats with 400–grit silicon carbide paper. I used exterior varnish so the finish wouldn't be destroyed if it got wet when the plant was watered.

Odd–Shaped Containers

The above procedure works fine for round containers, but what about odd shapes like a gallon paint thinner container? It's somewhat oval shape appealed to me. After doing some calculations and layout work, I made a router jig (see Jig Journal, opposite page). I used the jig in combination with my plunge router, 1/2" guide bushing, and 3/16" straight bit to rout the tambour groove that conforms to the container's shape.

Make the three contour markers mentioned in Jig Journal) out of pine or fir stock. A 19/64" hole accommodates a press fit for a standard pencil. Marker #1 is used to lay out the the outside contour of the pattern for the router template. Use marker #2 to lay out the cutout in the top piece relative to the groove. Number 3 gives you the outside shape to cut out on your band saw. The three markers also enable you to make a round planter if you don't own a lathe.

The paint thinner bottle requires twenty-eight 1/4" X 3/4" strips. The length of these strips can vary depending on the desired height of your finished planter, but they must be 3/4" longer than the cut bottle.

Routing The Tambour Groove

Cut two pieces of 3/4" cedar 8" X 10" and install one in the router jig. Secure the piece in the jig by wedging and shimming as necessary. Secure the template and rout the groove 3/8" deep with a 3/16" straight bit. Repeat the process for the other blank. When the groove is cut in the top and bottom, use the marker tools to lay out the outside shape on both, and the center cutout for the top. Cut them out on your scroll or band saw and smooth any irregularities with a file and sand paper. Rout the edges of the top and bottom and the top edge of the hole with a 3/8" roundover bit. Complete the rest of the planter as outlined above. PW

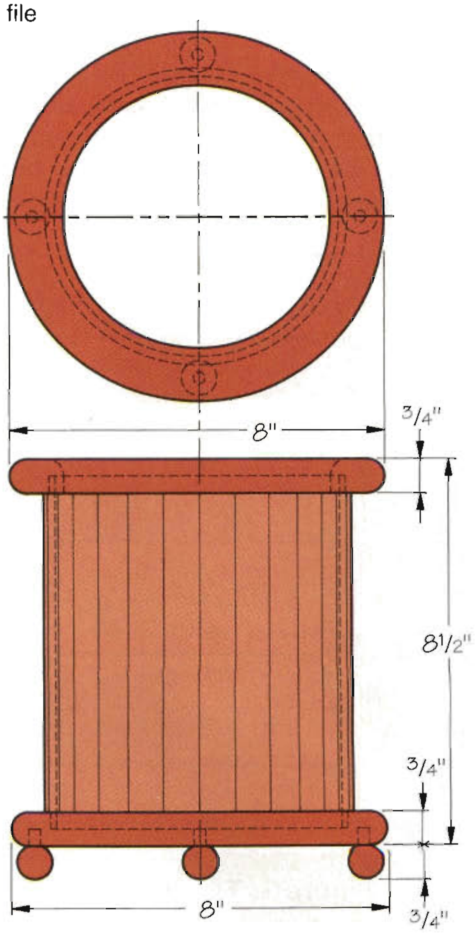
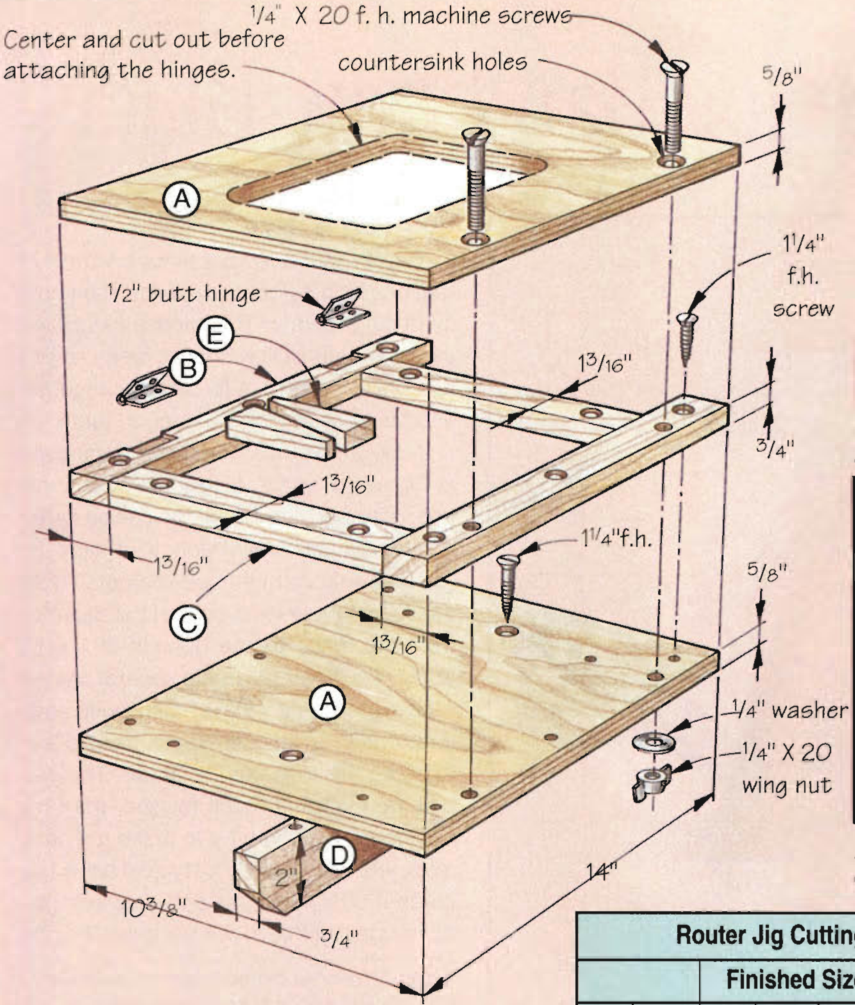


Figure 3. One Gallon Round Planter



Using the wedges, secure the blank in the router jig.

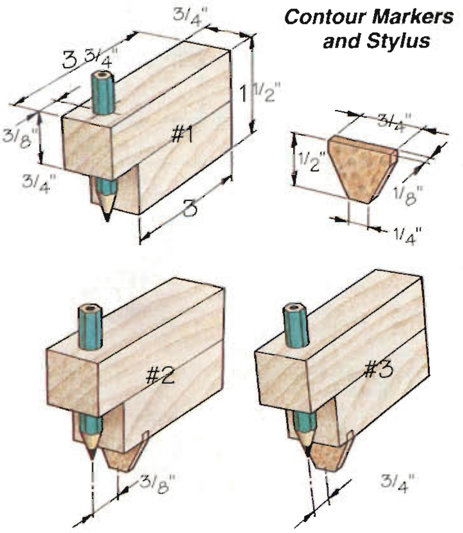
Rout the 3/16" groove with the jig securely clamped in the bench vise.

This jig is constructed to rout the tambour groove for an odd-shaped liner made from a paint thinner container. There is room left on the base so that wedges can be inserted to hold the work piece tightly. The clamping strip (D) on the bottom allows the jig to be mounted in a vise.

Router Jig Cutting List

		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
2	A	5/8"	10 3/8"	14"	top and bottom
2	B	3/4"	1 3/16"	14"	sides
2	C	3/4"	1 3/16"	8"	ends
1	D	3/4"	2"	14"	clamping strip
2	E	3/4"	3/4"	4"	wedges

Use a contour marker as described below to make a template for your top piece. This jig is designed to be used in combination with a plunge router and a 3/16" straight bit and a 1/2" guide bushing.


Contour Markers and Stylus

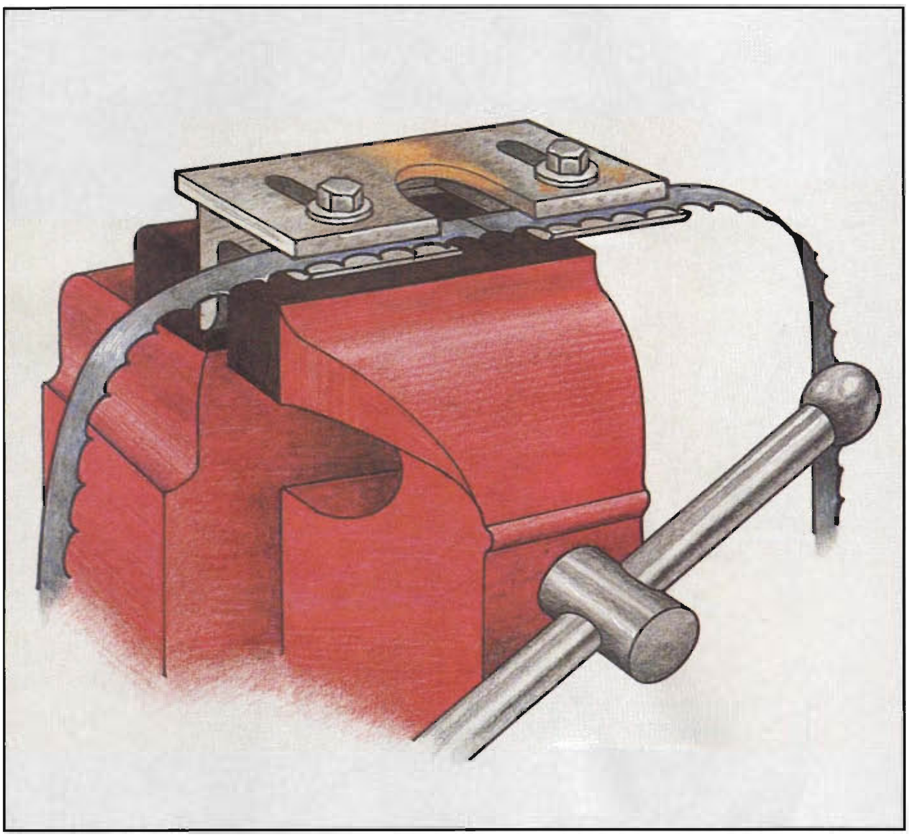
Tom Larson

The pencil hole must be 3/8" from the end of the #1 marker to trace the contour of a container.

Once the tambour groove has been cut use the #3 marker to draw the outside contour.

These contour markers can be made out of any stock. A 19/64" hole accommodates a press fit for a standard pencil. These markers, in combination with the above router jig, will enable you to make a round planter if you don't own a lathe. PW

Brazing Fixture for Band Saw Blades



Bob Chapla and Ginny Pruitt

by Allan R. Nye

Band saw blades break for a variety of reasons long before they've lost their ability to cut properly. This simple fixture will align the ends of that broken blade so you can braze (silver solder) it back together and continue to use those good teeth.

Make the fixture to the dimensions given in Figures 1 and 2. Use aluminum angle iron, not steel. The aluminum can be milled on your router table with a straight bit (carbide only, no high–speed steel). To cut the lip the blade rests on, set the distance from the fence to the outside of the bit to 1/2". You'll want to make several passes —take off a paper–thin shaving with each pass and keep the total depth of cut to less than the thickness of the blade. The carbide on the bit is much tougher than the aluminum, but if you try to make too deep a cut, you may chip it. The typical band saw blade is .025" thick. Use a V–shaped high–speed steel drill bit to drill the holes. For the

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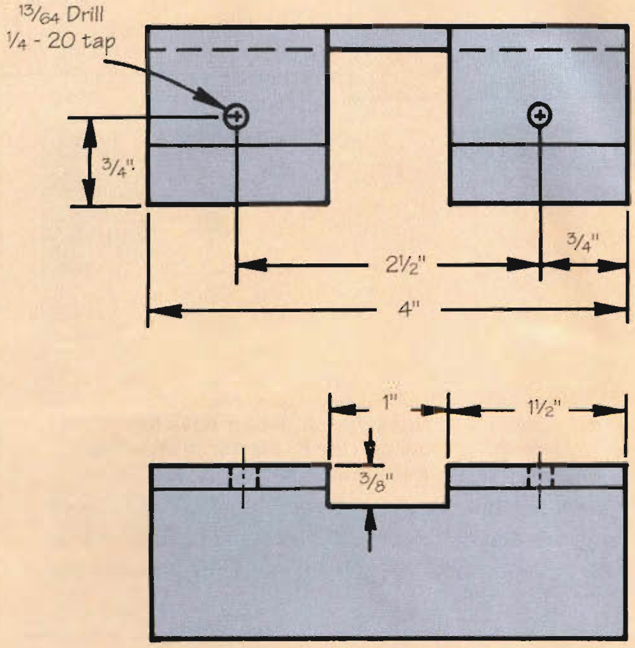
Allan R. Nye is a retired research engineer and full-time woodworker in San Antonio, Texas.

Figure 1. Angle Iron



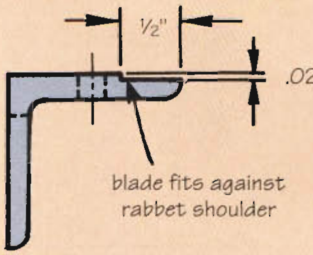
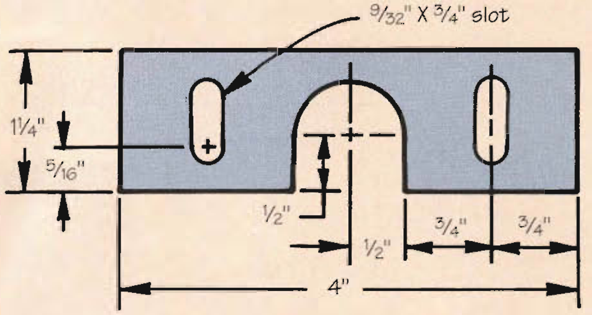


Figure 2. Clamp Plate



Bob Chapla and Ginny Pruitt

slots in the clamp plate, first drill the end holes, then use a metal–cutting blade in your scroll saw to cut the straight lines.

Your hardware store will have the $^1/_4$" X 20 (threads per inch) tap, bolts, and silver solder. Don't use regular lead–tin solder; it's not strong enough. You can use your belt sander to smooth rough edges, but make sure there's no sawdust in the bag for the hot filings to fall into.

Brazing Procedure

Clamp the fixture in your vise. Grind the broken ends of the blade to make an overlapping scarf joint. Next, place the back edge of one end of the blade against the machined shoulder of the fixture. Center the end in the gap. Install the clamp plate so the front edge is up to the back edge of the teeth and finger–tighten the bolt. Slip the other end under the clamp plate, up against the fixture shoulder, and butt it against the other end. Tighten both screws; then apply flux to the joint and solder. When the joint has cooled, remove the blade from the fixture and grind the joint smooth on the flat surfaces. Be careful not to let the blade get too hot or you could remelt the solder. PW

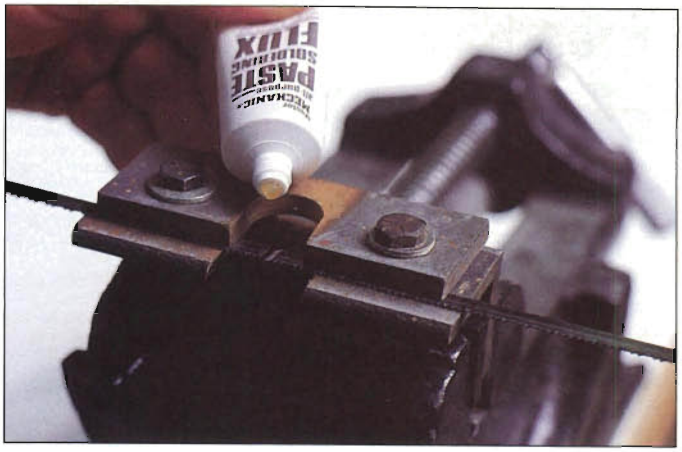
Sand the broken end straight, then sand a scarf joint into each end for good contact.

Another good use for the brazing fixture is the soldering of bulk band saw stock. This can save you some money, especially if you go through a lot of blades. Look in the Yellow Pages under the heading "Saws—Sharpening and Repair" or contact the following mail–order companies:

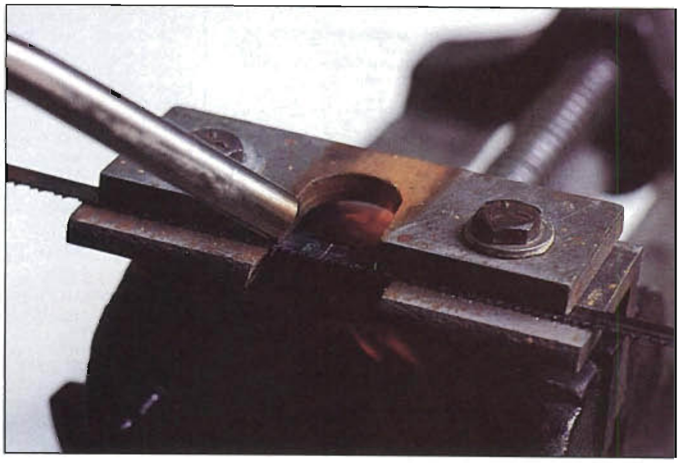
Trend–Lines
375 Beacham Street
Chelsea, MA 02150
Tel. 1-800-767-9999

Woodcraft Supply Corp.
P. O. Box 1686
Parkersburg, WV 26102-1686
Tel. 1-800-225-1153

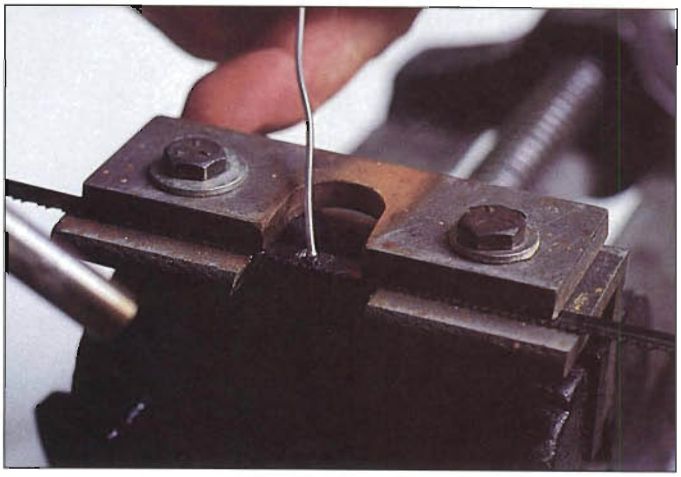
Bruce Richmond



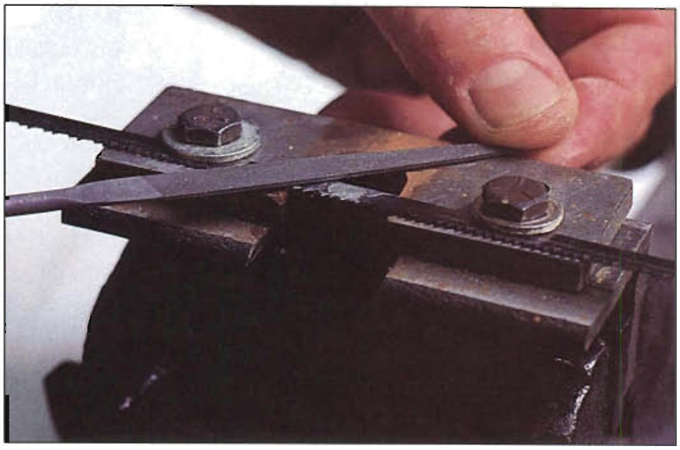
Apply paste flux to the joint to be soldered.



Heat the area with a torch until it's red–hot. Don't apply the flame directly to the solder.



Touch the silver solder to the heated joint. If it's hot enough, the solder will melt and flow into the joint.



File off the excess solder when it has cooled. Remove the repaired blade from the fixture and smooth the joint with a belt sander.

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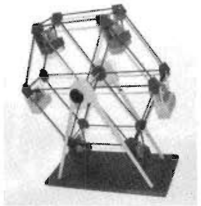

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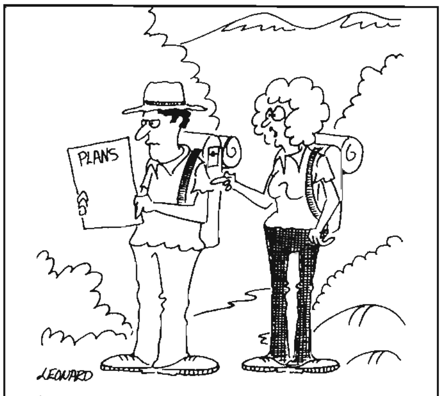

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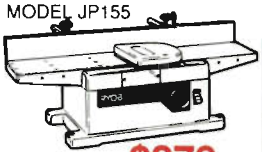

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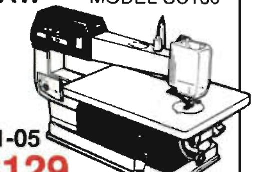

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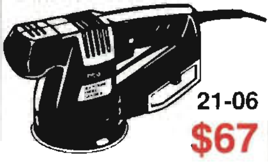

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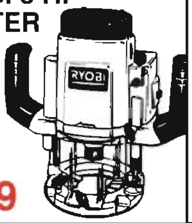

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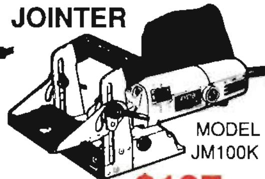

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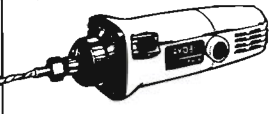

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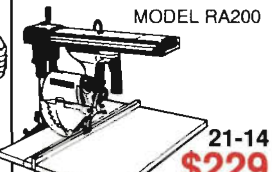

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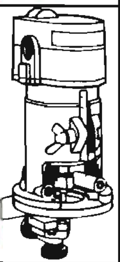

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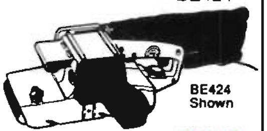

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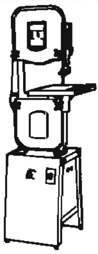

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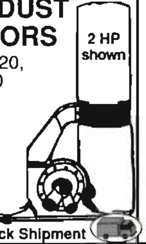

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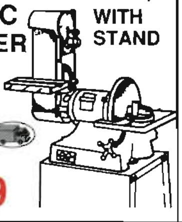

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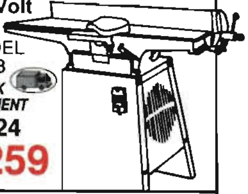

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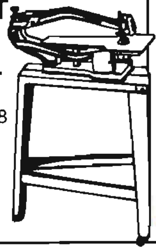

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MODEL 3263DVS

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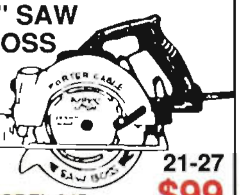

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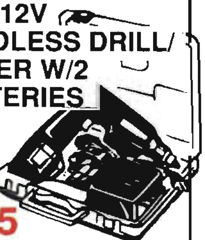

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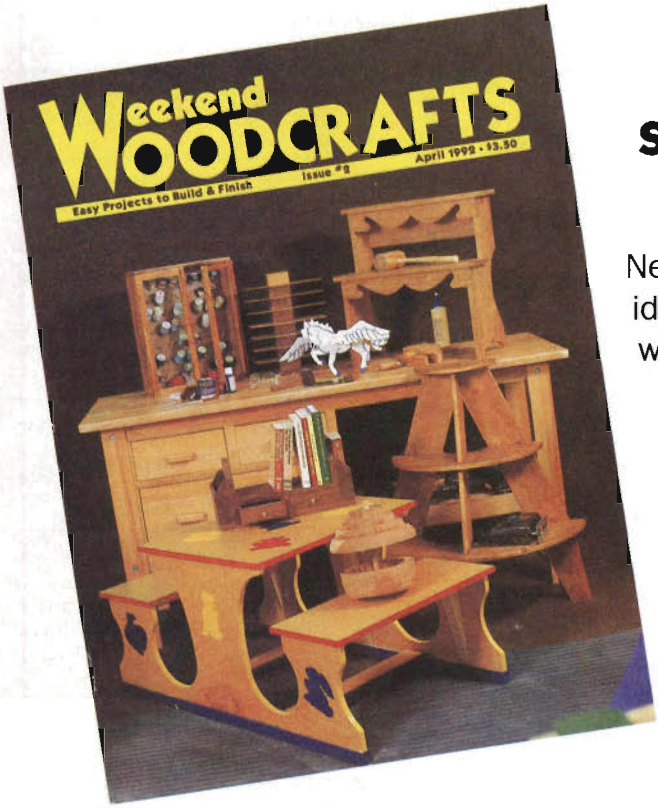

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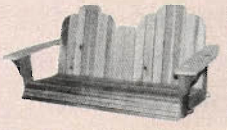

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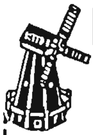

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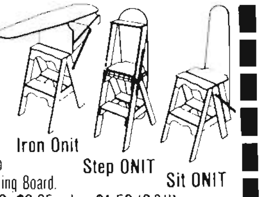

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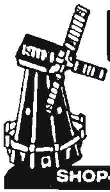

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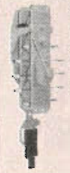

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Classified Rate: $2.25 per word; 15–word minimum. **One–Inch Marketplace**: $220 per issue. Payment must accompany all ads (not commissionable). Deadline for Issue #66 (May 1992) is February 1, 1991. ***Popular Woodworking***, Dept. Class.,1320 Galaxy Way, Concord, CA 94520, (510) 671-9852.

Tool Talk by Sanford Wilk

Plunge Routers

The great advantage of the plunge router is its ability to perform complicated shaping maneuvers. Unlike fixed–base machines, which must be tilted into cuts that don't start at an edge, the plunge router can be lowered into position. Slot mortising and blind dado work are much safer and good results easier to achieve. You can still use it for edge–shaping operations, and it's your best bet for template cutting. Another safety feature you might not notice comes from the design of the plunge mechanism itself. When you release the lever that controls the plunge lock, the bit automatically raises up and away from both you and the workpiece.

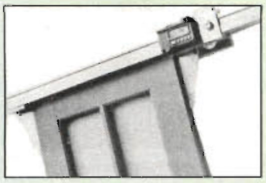
The plunge router provides a more effective method for handling those multiple passes common to many woodworking operations. Slotting a 1½" mortise into a piece of 12⁄4 chestnut isn't easily and cleanly handled by any machine, so woodworkers have had to accommodate deep cuts and fierce wood types by running the bit through more than once. Lowering the bit takes time on a conventional fixed–base unit because you often have to release and "turn down" the entire housing. Plunge routers are equipped with a depth stop turret you can rotate to a different setting each time you want to make a deeper pass. Set–up time is cut from minutes to seconds.

The powerhead, contained in a plastic or metal housing, is a direct drive universal motor that rotates a collet. The collet chucks around the bit, and larger machines that utilize a ½" collet can also be fitted with a smaller collet that will accept ¼" bits. The housing rides up and down on two posts; a plunge lock lever adjacent to one of the handles controls the plunging action. A depth scale built into the housing lets you determine and control the precise amount of plunge. Some machines have an optional fine–tuning scale that permits precise adjustment.

Plunge routers also incorporate a turret to control the depth for

***Sanford Wilk**, a builder and organic architect in Boston, Massachusetts, heads a team of craftsmen who evaluate tools under actual working conditions.*

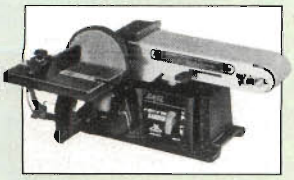
NEWS & NOTES



The ProCaliper is the latest digital rule from Accurate Technology. It features a digital LCD readout to provide a higher degree of accuracy. The ProCaliper can be set to read decimal inches, fractions, or metric measurements. (Accurate Tech., 11533 N.E. 118th Suite 200, Kirkland, WA 98034. 800-233-0580)

If you're concerned about accidental clamp opening, severe stresses, vibration, or overhead installations, consider the Toggle–Plus line of clamps. These clamps have a locking release lever that maintains over–center locking until you release the lever. They exert from 375 to 750 lbs. force, while the heavy–duty models, with levers that lock into forged steel bases, exert up to 2500 lbs. force. (De–Sta–Co, Box 2800, Troy, MI 48007. 313-589-2008)

The RotoMite Rockin' Router is a multi–use tool for professionals and D–I–Y'ers that cuts perfect openings in wallboard and wood paneling. Only 2 ½ lbs, the RotoMite offers one–hand control and virtually dustless operation. (RotoZip Tool Corp., 1861 Ludden Drive, Cross Plains, WI 53528. 1-800-521-1817)



Skil Corporation introduces a benchtop combination 4" belt / 6" disc sander (Model 3370) featuring a 1/3 horsepower motor, dust collection, quick-release belt adjustment and a miter gauge for simple and compound angle sanding. The aluminum table adjusts to 40° with storage space for Allen wrenches. (Skil Corp., 4300 West Peterson Ave., Chicago, IL 60646. 312-286-7330) multiple passes. The turret may be a single–position type that saves very little in set–up time; other routers offer an overkill turret with up to eight positions so you can drive yourself mad making eight shallow passes.

The base can be round, square or some hybrid form. If you use straight edges as your primary guide, a square base gives the most stability. But if you use curved templates often, the round base lets you rotate the router as it follows the shape of the curve. If you use both straight and curved templates, then try a round base with one flat side.

AEG OFS50

This is the smallest and lightest router we tested. It has only one speed, but don't let that deter you. Only larger tools (two horsepower or more) really benefit from a multiple–speed control. This unit runs smoothly and handles easily thanks to the attention paid to ergonomic detail. One hitch we had was a collet that wouldn't let go of the bit; it had to be dislodged by force. This problem may be temporary—fixing itself after significant usage. The three–position turret combined with a 1/64" depth scale brings high–end accuracy to this unit, and a super–fine–tuning fence comes standard with the machine. If you're looking for a plunge router with nice weight, a good feel and high accuracy without excess amperage, look here. (AEG Power Tool Co., Three Shaw's Cove, New London, CT 06320. Tel. 800-243-0870)

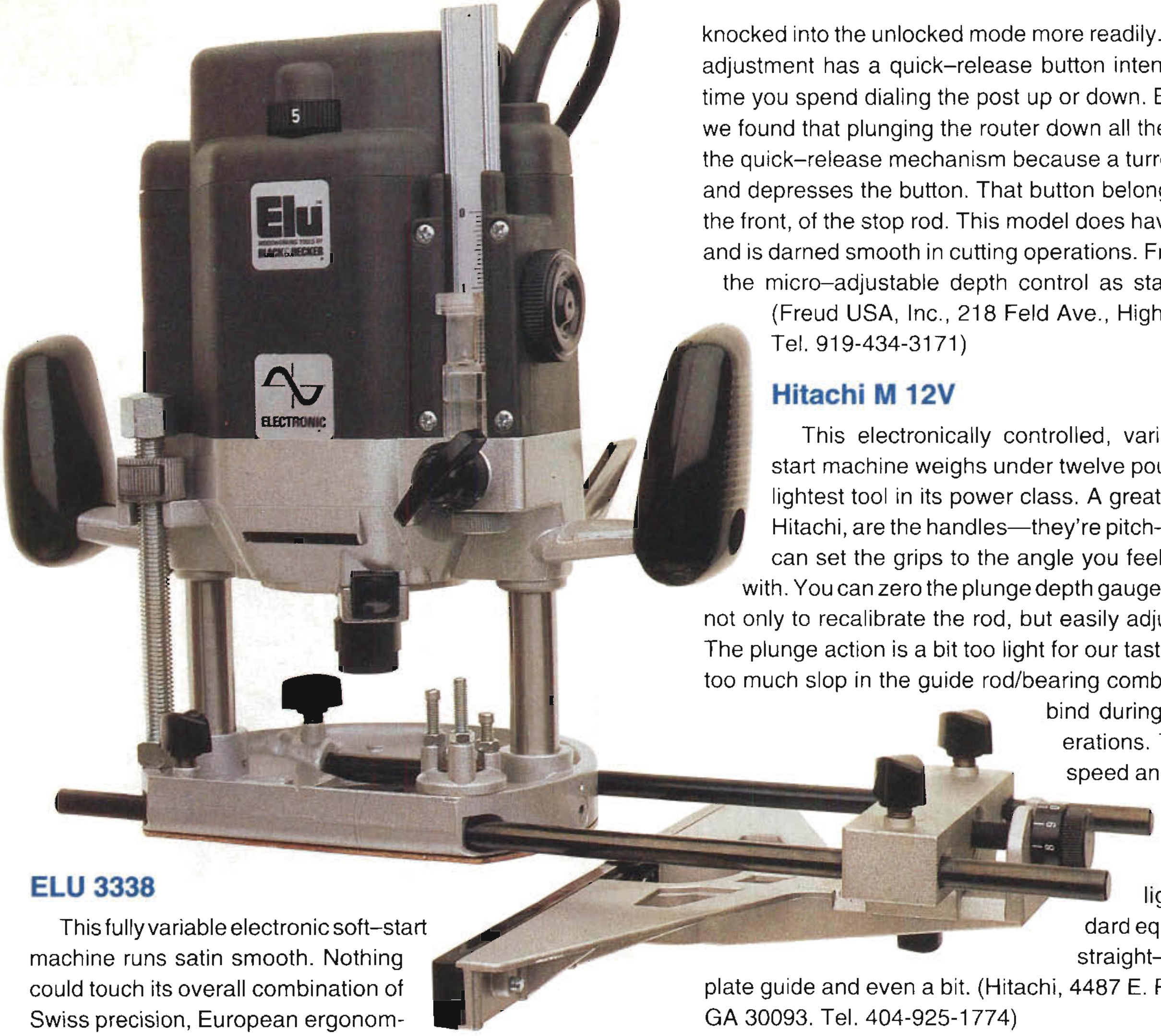
AEG OFS50

Bosch 1615EVS

Bosch 1615EVS

This unit replaces the model 1611EVS with minor upgrades in electronics and smooth user action. Thanks to the soft–start feature, the tool avoids a sudden burst of torque when you turn it on. The electronic speed control adjusts via a dial on the machine's brow, allowing you to choose between ten different speeds, depending on the material you're working and the bit size. Of all the multi–speed routers, this one has the slowest top–end speed. That's fine for large–diameter cutters, but not for smaller ones, such as a 1/4" beading bit. Bosch also offers the same high–end electronics on some smaller routers not included in this review.

A nice feature here is a spring–loaded plunge lock lever that reverts to the locked position. Only Bosch and Porter–Cable offer this advance in safety and convenience. Other units spring back to the unlocked position, requiring more effort from you to change and lock the plunge depth. Another safety feature is the hand grip on–off switch—you don't have to take either hand off the handles at any time for plunging or powering on and off. The turret offers eight positions which are set and can't be adjusted. This number of stops can be confusing, especially if you skip a step or two; perhaps Bosch could number them for easier recognition. This machine ran like a champ, giving consistently high results. (Bosch Power Tool Corp., 100 Bosch Blvd., New Bern, NC 28562. Tel. 800-334-4151)



ELU 3338

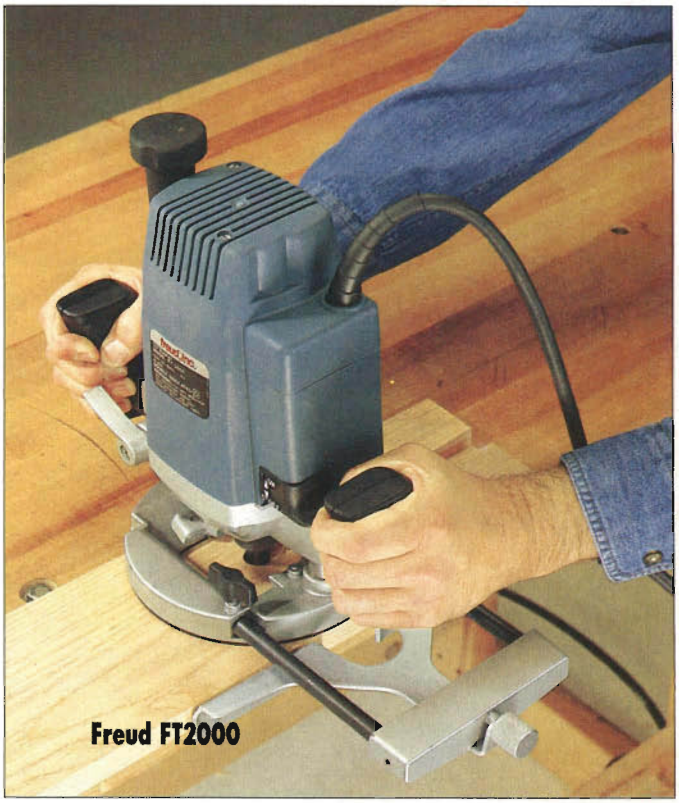
This fully variable electronic soft–start machine runs satin smooth. Nothing could touch its overall combination of Swiss precision, European ergonomics and durable construction. At only 12 amps, it's not as powerful as some of the other tools tested, but we could find no reasonable way (or wood) to slow it down. Its electronics maintain the running speed as accurately as a Swiss watch keeps time. The plunge depth gauge is a joy—it clearly magnifies the readout and is easily set for zeroing the cutting tool to the sub–base. Our shop decibel meters say this unit is the quietest running of those we tested. The plunge return offers the liveliest spring action. Our only complaint is the thinness of the phenolic resin sub–base, which came slightly distorted. A small wave in it caused the unit to catch on some small, irregular surfaces. This may have been a fluke, but a stiffer, thicker sub–base would be an improvement. The micro–adjustable *fence* that comes standard is another example of tool engineering and manufacturing working in harmony. It's the finest of the plunge routers we tested. (Elu/Black & Decker, 10 N. Park Dr., Hunt Valley, MD 21030. Tel. 410-527-7000)

Freud FT2000

At 22,000 rpms, this single–speed machine runs a bit too fast for us—a large cutter like a raised–panel bit can't do its best job at that speed. Smaller bits perform nicely, but the large ones may end up burning the stock. And if you exceed the bit manufacturer's recommended RPM, safety becomes a problem. The plunge lock lever locks with an upward rather than downward motion, which is awkward and could be a problem since the lever can be knocked into the unlocked mode more readily. The plunge depth adjustment has a quick–release button intended to lessen the time you spend dialing the post up or down. But in our test unit, we found that plunging the router down all the way can activate the quick–release mechanism because a turret stop bumps into and depresses the button. That button belongs on the side, not the front, of the stop rod. This model does have plenty of power, and is darned smooth in cutting operations. Freud also throws in the micro–adjustable depth control as standard equipment. (Freud USA, Inc., 218 Feld Ave., High Point, NC 27264. Tel. 919-434-3171)

Hitachi M 12V

This electronically controlled, variable–speed, soft–start machine weighs under twelve pounds, making it the lightest tool in its power class. A great feature, unique to Hitachi, are the handles—they're pitch–adjustable, so you can set the grips to the angle you feel most comfortable with. You can zero the plunge depth gauge, making it possible not only to recalibrate the rod, but easily adjust the scale itself. The plunge action is a bit too light for our taste, and there's a bit too much slop in the guide rod/bearing combination, so it could bind during some plunge operations. The unit has good speed and power ranges as well as a noticeable advantage gained from its light weight. Standard equipment includes a straight–edge fence, template guide and even a bit. (Hitachi, 4487 E. Park Dr., Norcross, GA 30093. Tel. 404-925-1774)


Freud FT2000

Hitachi M 12V

Porter-Cable 7539

Makita 3612BR

This particular single–speed model comes with either a round or a square base. Like the Freud unit, it has a speed problem—with the added handicap of an additional 1000 rpms. This limits the machine's capabilities and could pose a safety problem under certain conditions. It is one of the more compact machines we tested, and the extra maneuverability is a plus. The quick–release button is designed and works well. The spring on the plunge lock lever doesn't offer much in the way of return action. It doesn't impair the plunge–locking ability, but if the design were better, the lever would default to an unlocked position more readily. The spring action on the plunge itself is a bit too light and borders on unpredictable since it can drop too fast if you're not used to its motion. The power switch and plunge lock controls are small but conveniently located. (Makita, 14930 Northam St., La Mirada, CA 90638. Tel. 714-522-8088)

Porter–Cable 7539

This model may be a beast in size and weight, but it's a true workhorse. Although it's listed as variable–speed, it's actually a five–speed router with electronic controls to regulate cutter rpms. The power switch is conveniently located in the handle and designed for index finger use. Another nifty feature is the plunge lock lever—it's large, heavy–duty and returns to the locked position. The six–position turret has a very simple but effective depth scale that is easily zeroed.

Unlike all the other routers tested, this model does not have removable inserts that fit into the sub–base. The 1$^3/_{16}$" diameter of the sub–base opening matches the size of the manufacturer's standard bushing, but some medium and many large diameter bits can't be used with it. You'll probably want to buy the optional sub–base (#42187) made of clear plastic with a

Makita 3612BR

Maker	Model	RPM	Collet	Rated Amps	Depth Stops	Plunge Depth	Spindle Lock	Weight	Electronic	Rating	Price
AEG	OFS 50	2500	¼"	6.25	3	1¹⁵⁄₁₆"	yes	5.5	no	9	$299
Bosch	1615 EVS	12000-19000	½"	15	8	3"	yes	12.25	yes	9	$460
Elu	3338	8000-20000	½"	12	3	2⁷⁄₁₆"	yes	11.25	yes	9.5	$412
Freud	FT2000	22000	½"	15	3	2¾"	yes	12.5	no	7	$350
Hitachi	M 12V	8000-20000	½"	15	3	2⁷⁄₁₆"	yes	11.7	yes	8.5	$447
Makita	3612 BR	23000	½"	14	3	2½"	yes	12.5	no	7.5	$347
Porter-Cable	7539	10000-21000	½"	15	6	3"	no	17.25	yes	8.5	$485
Ryobi	BE 600	10000-22000	½"	15	3	2⅜"	yes	13.6	yes	8	$445
Sears	27504	10000-22000	½"	15	3	2⅜"	yes	13.6	yes	8	$225
SKIL	1870	23000	½"	12	3	2½"	yes	9.5	no	7	$270

2½" opening. A square sub-base (#42191) is also available and is designed to be turned from one side, which is roughing distance from center, to a shorter side, intended for clean-up cuts. Unfortunately, the tool has no arbor lock, which makes bit changing more difficult, but the soft-start electronics and overall high power and attitude make this machine a good choice. (Porter-Cable, Box 2468, Jackson, TN 38302. Tel. 800-321-9443)

Sears 27504

Ryobi RE600/Sears 27504

This tool, made by Ryobi, is available in both "Ryobi Blue" and "Sears/ Craftsman Black." It's a fully variable-speed, soft-start machine that comes standard with a micro-adjustable depth-of-cut knob. The ergonomic engineering is excellent; the speed dial and power switch are located for your comfort. A little too much play in the guide rods and bearings led to some binding problems during testing. This model weighs in at 13.6 pounds, right behind the Porter-Cable unit. These two units have the same amperage rating as the Hitachi, so it seems the guys in green place a higher value on lighter weight for user comfort. The plunge lock lever (unlock default) is spring-loaded, and the spring does push it back to home position. The depth scale is a bit primitive since it can't be zeroed-out like scales found on some other units, but Ryobi is generous with standard accessories—a template guide as well as a nice straight-edge that handles most jobs with reasonable accuracy. (Ryobi America Corp., 1424 Pearman Dairy Rd., Anderson, SC 29625. Tel. 800-323-4615, or Sears stores throughout the country)

Skil 1870

Skil 1870

By the time you read this, Skil will be marketing another, even more advanced electronic version of this tool. This router is a single-speed unit that runs, like the Makita, at a fast 23,000 rpms. But in this case the machine is only twelve amps and is not designed to be a heavy-duty work hog. For a medium-duty router, a single speed is more realistic. This unit is both lightweight and compact, and has a wrench storage slot built into the head. The power switch location in the handle, combined with the overall design, make this tool comfortable to use. The depth-of-cut scale and stop mechanism need improvement—the stop rod can lose its position if you plunge down too hard. The cord juts out of the housing towards the rear and seems to get in the way more than it should. Power is smooth and capable of handling medium-duty applications. (Skil Corp., 4801 W. Peterson, Chicago, IL 60646. Tel. 312-286-7330) PW

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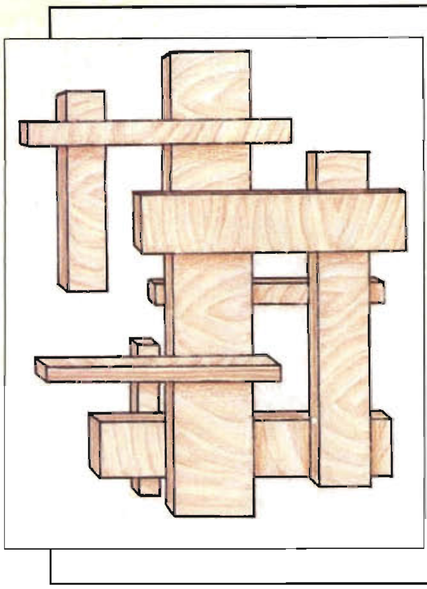
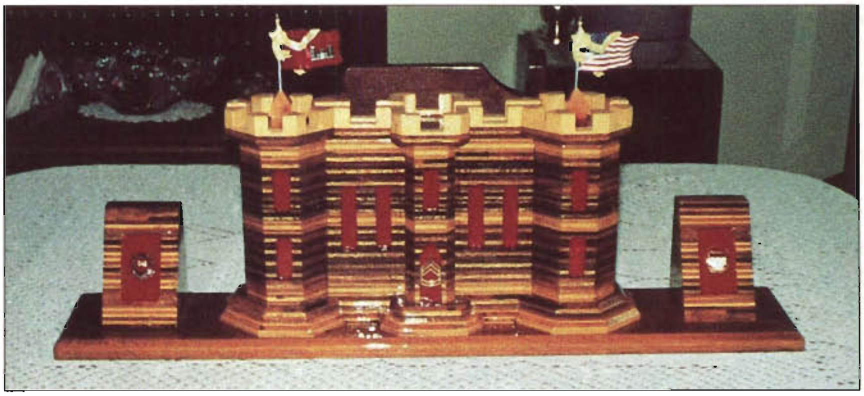


SCRAP SOLUTIONS

Scrapwood Challenge #2 was presented in our January Issue. We invited readers to submit project ideas for plywood cutoffs. Since these are often found in short (3" to 5" in the direction of the grain) and wide (up to 48") pieces, we encouraged the use of scrap that roughly fits these dimensions.

Although it may seem limiting to have to work with the random dimensions of leftovers, this is often just the spark that can set the creative mind in motion. Of the many factors to take into account when designing, the first is usually the function of the piece. In the scrapwood challenge, we encourage function to follow form. In fact, the project need have no practical purpose except to display creative ideas based on what the past has left for the present. Inherent in this concept is a respect for the limited availability of wood—conserve and create, recycle and render your ideas... in scrapwood.

The rewards are plenty: all published projects get a one–year subscription. Honorable Mentions get an embossed back issue binder and an embossed T–shirt! The winner will get a new, (or near–new) power tool worth big bucks (and the T–shirt and other stuff too)!



Corps of Engineers Castle

I am a Sergeant First Class in the U.S. Army Corps of Engineers. The castle is a distinctive symbol of Military Engineers worldwide.

This desk set is very attractive if alternating strips of ply and other woods are used.

The body of the castle is made of thirteen pieces of 1/2" ply of the same dimensions glued together. The crest blocks are constructed from nine pieces of 1/2" ply, glued together and cut diagonally to form two identical pieces. The windows, doors and crest blocks are routed 3/8" deep.

After cutting all pieces to size, glue together the body parts and side blocks. Next, sand and shape all parts. Route windows, doors, crest plates. Bevel a 45° angle on the base plate, subbase, base and top support. Route the top piece to form the crenulations. Varnish or lacquer individual parts. Mount subbase, base and crest blocks to base plate using 1/2" screws then secure top and top support to body using 1 " screws. Glue the flag supports on top. Paint windows, doors, and crest block openings with red enamel. Spray entire project with lacquer. Finish the piece by attaching crests and flags.

Ernest Souza, Ft. Leonard Wood, MO

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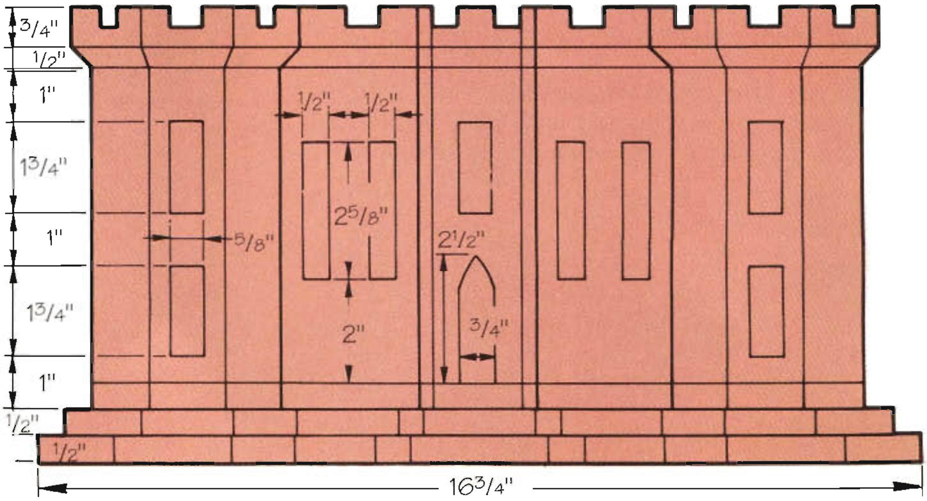
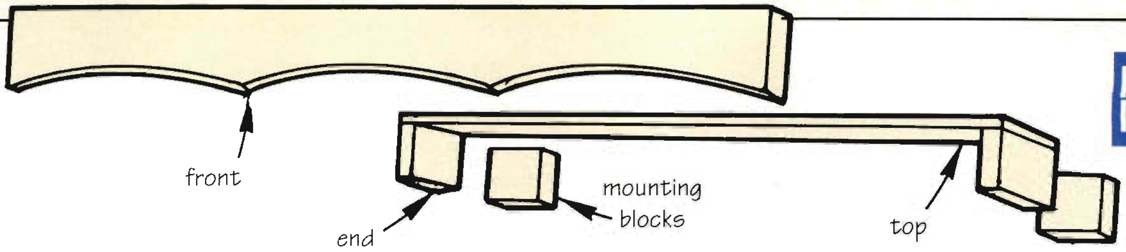




HONORABLE MENTION

Window Valence

Those leftover plywood ends are just right for making some attractive window valences to hide the tops of drapes and the slide hardware.

Pieces can be butt glued end to end along the grain lines to the proper dimension, and depending on the final finish selected, might even be glued in the other dimension. Construction is fairly simple using glue and screws, or finish nails. The edge plies are mostly invisable except for the view straight up and from the sides of the drapes, and even that is attractive if sanded smooth. The front piece can be left rectangular or you can cut some attractive scallop curves along the bottom.

The valences can be mounted to small blocks screwed into wall studs above the drapes. Finish is straight forward and the valences can even match the cabinet you made from the original plywood sheet.

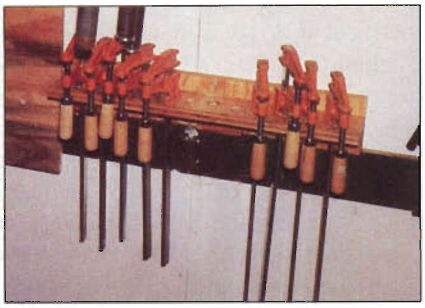
Harold McAleer, Lincoln, MA

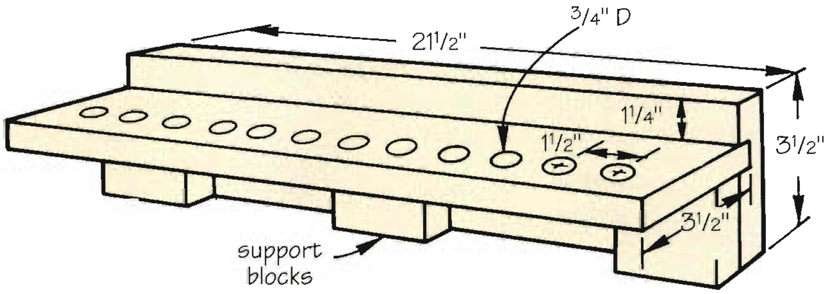
Clamp Rack

I cut two pieces from one piece of 3/4" x 3 1/2" long by 48" wide fir plywood, which gave me 2 pieces 3/4" x 3 1/2"x 21 1/2", the remaining piece is for the glue blocks. I made a dado cut 3/4" wide by 3/8" deep through the entire back piece 1 1/4" from the top.

I drilled 12 3/4" diam. holes in the top piece. All of the holes are 1 1/2" on center. the holes are drilled 1 1/2" from the face of the back piece. The remaining piece is cut into three glue blocks and glued under the top for support.

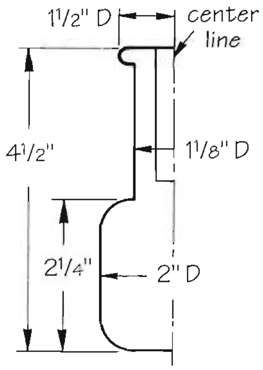
John Trisch, La Crosse, WI

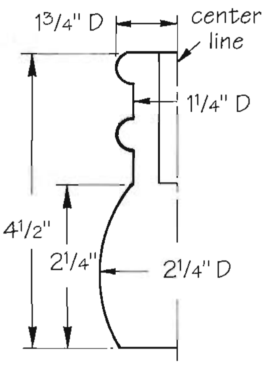


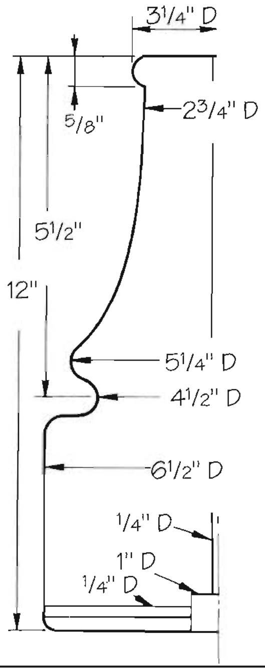


Stacking and Turning

James Long of Harriman, Tennessee has come up with some beautiful patterns from an old idea - stack those old 3/4" solid core ply scraps, roughly shape them, then turn them into a lamp base or bud vase.







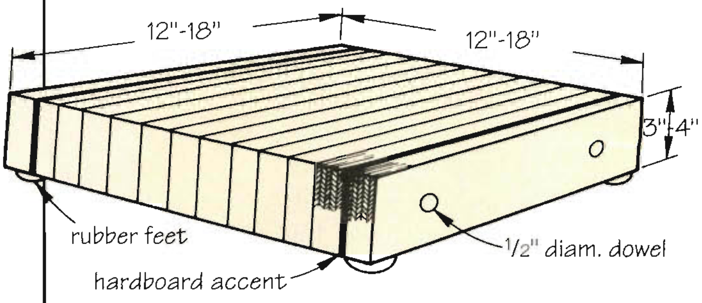
Kinnaman's Solutions

Don Kinnaman, who writes many articles and shop "kinks" for us from his home in Phoenix, Arizona, keeps entering our scrapwood challenges, even though we've told him he can't win. We were afraid some would consider it unfair for him to get a prize, since he's listed as a Contributing Editor in our masthead.

Actually, Don was the inspiration for the contest; his letters are always full of ideas for scrap. He's a fellow who's clock's always ticking. Now that we feature a challenge in every issue, Don's clock is putting in overtime. We couldn't resist sharing a couple of his suggestions with you. If no one minds, we're going to send him a shirt too.

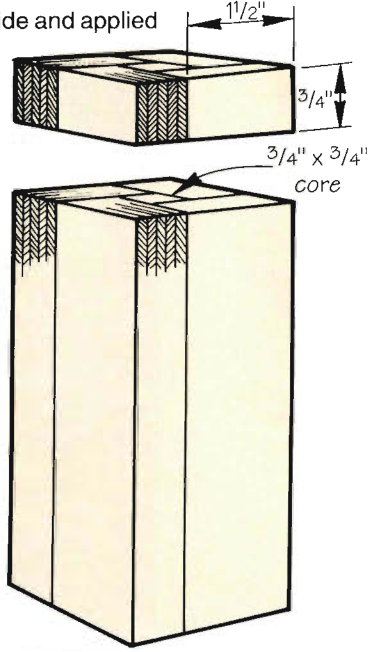
Kitchen Chopping Block

This chopping block is glued face to face as shown. A strip of hardboard in between each side gives a *featured strip* effect. The block can be strengthened by passing 1/2" dowels through the block. Sand smooth, round the corners, and apply several coats of laquer. The cutting surface is coated with mineral oil (from the pharmacy). It is non-organic and will not get rancid with use.



Pile of Parquet

Cut several cores from hard or soft wood 3/4" x 3/4". The outside scrap plywood can be any length or width, but cut to fit the core. If 3/4" stock is used, outside ply pieces are cut 1 1/2" wide and applied to the core as shown. If a 1 1/2" core is used, the outside plywood strips are cut to 2 1/4." When the glue has set and excess removed, the glued up block is then cut into 3/4" thick slices and these are then glued side by side to form a mosaic or a parquet panel. When assembled and sanded smooth, several coats of finish are applied. These panels can be used for table tops, lamp bases or other multiple uses.



Tool Bit Box

Scrapwood Challenge #2 inspired an idea to solve two problems at once: what to do with scrap plywood and how to organize miscellaneous tool bits. I built a tiered container for these bits that has holes drilled for the shanks.

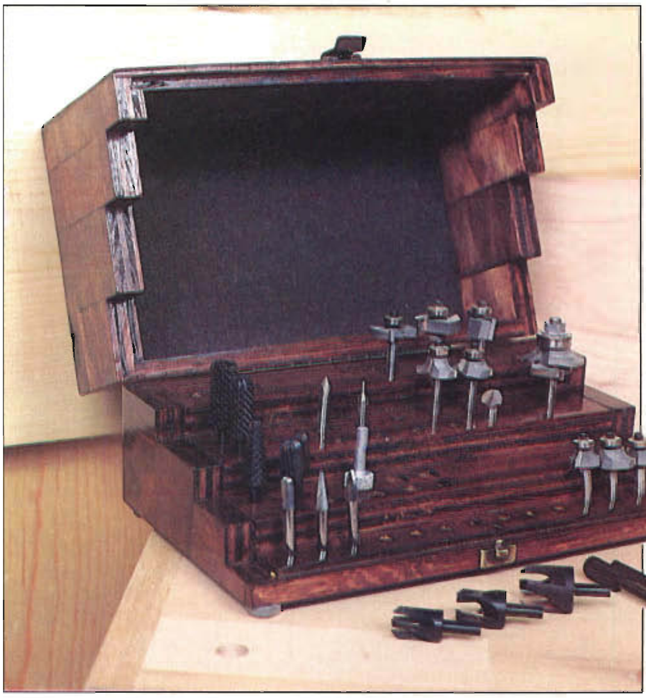
My plywood was not exactly ¾" thick, so I glued the steps (A, B, C and D) first and used the resulting base as a template to dimension the parting line for the sides. Each side (E) is made from four matching blocks (E) cut from the same scrap piece. Cut each block to 6" long, plus the thickness of your saw kerf. Lay four of these blocks edge to edge and trace the assembled base onto them. Cut the individual blocks in two to the lengths indicated by the base, and cut a matching set for the other side.

To put together the sides, I made a gluing jig from two scraps screwed to a scrap of plywood at 90° to each other and lined it with wax paper. Lay all the pieces for a complete side piece in the gluing jig and clamp them together (be careful not to glue the parting line together). Once both sides are glued, cut the front and back rabbets in the upper portion, as well as the groove to accept top piece (F).

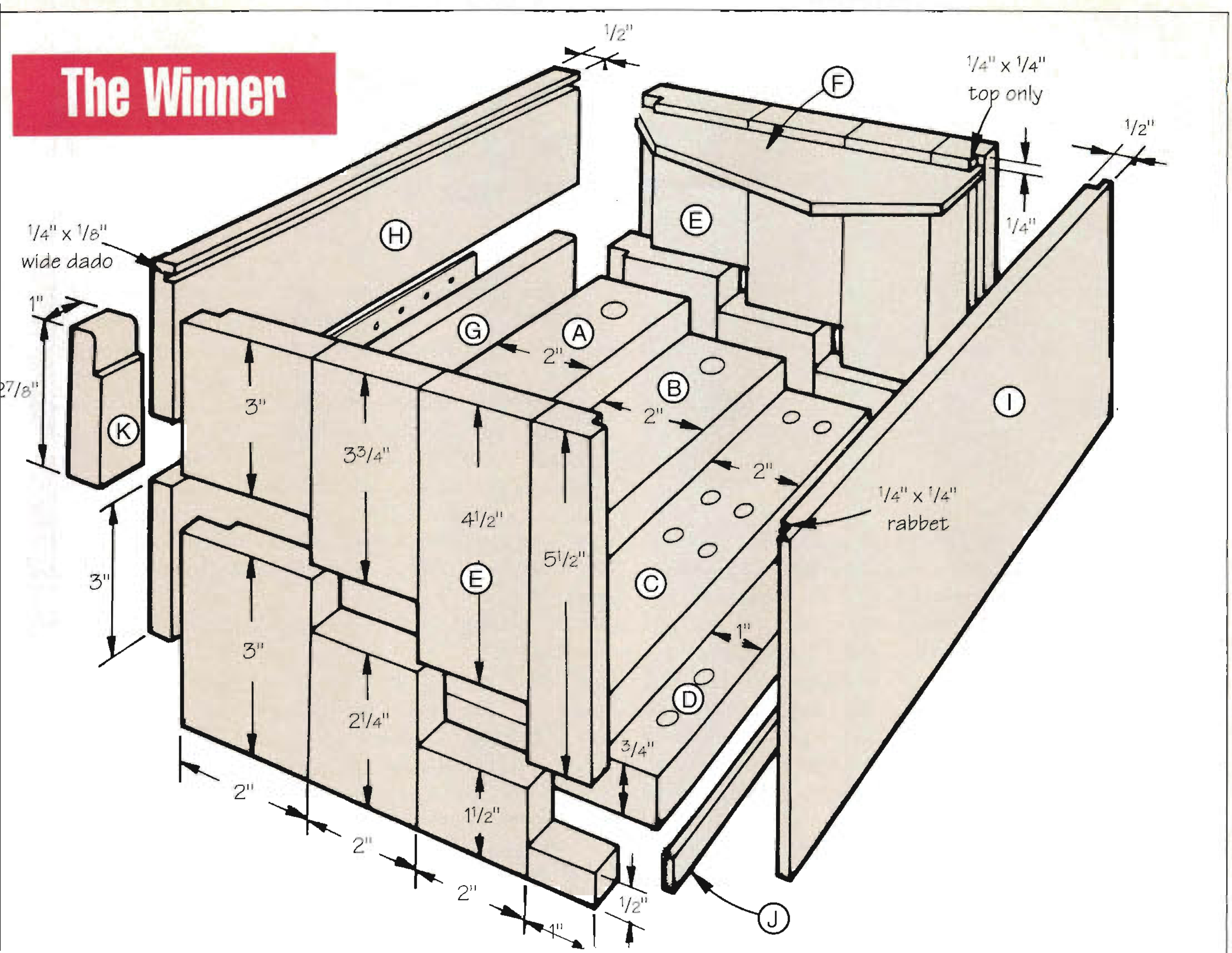
Cut the base back piece (G) to length, and cut it to height using the stacked steps as a template. Cut the lid back piece (H) to size and cut a groove on the top inner edge for the top (F). Make the lid front (I) out of ½" ply. Cut a ¼" X ¼" rabbet down both ends and across the bottom edge. This last rabbet will fit over part of the bottom step; make the base front (J) out of ¼" plywood to fill the rest of the space.

Assemble all the pieces. Then install a short piece of piano hinge and position the lid stop block (K) to determine how far the lid opens. Make sure to allow enough clearance to drill holes in the top tier. After finishing your bit box, install a latch and feet, and drill slightly oversized holes for the bit shanks.

Charlie Murrin, Vienna, WV



The Winner



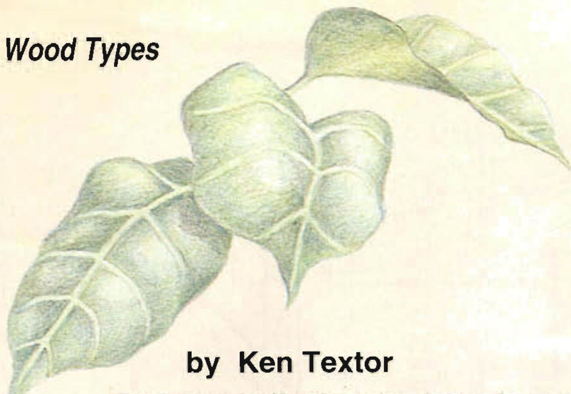
Bit Box					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
1	A	¾"	1½"	10¼"	top step
1	B	¾"	3½"	10¼"	2nd step
1	C	¾"	5"	10¼"	3rd step
1	D	¾"	6"	10¼"	bottom step
8	E	¾"	2"	6½"	side blocks
1	F	⅛"	6¼"	10¾"	top
1	G	½"	3"	10¾"	base back
1	H	½"	3"	10¾"	lid back
1	I	½"	5½"	11¾"	lid front
1	J	¼"	½"	11¾"	base front
1	K	¾"	1"	2⅞"	lid stop block

The Big Prize: Ryobi 12v TFD-220VR Cordless Driver Drill

When they're not in his bit box, as the winner of Scrapwood Challenge #2, Charlie can chuck up his drill bits in this 12-volt Torque Force Cordless DriverDrill from Ryob. The tool features a keyless chuck, and is available with a fifteen-minute recharger. At 220 in/lbs of torque, it's one of the most powerful tools in its class.

Scrapwood Challenge #4

Head for your scrap pile, and pull out that 2" X 7" X 10" block of hardwood thats been sitting there for all those years. Root around some more and find a piece of the same species–roughly 1" X 3" X 24". Now get to work! **Send your ideas by May 22, 1992** to; *Scrapwood Challenge #4*, 1320 Galaxy Way, Concord, CA 94520. Include a dimensioned sketch, instructions and cutting list if applicable. A good photo of the project will help your chances immensely. Entries become the property of *Popular Woodworking*, and the decision of its editors is final. Notification of winners will be by publication in the Sept. 1992 issue.



Teak

by Ken Textor

From the time Dutch traders began importing teak in the 1500's, it has been an expensive woodworking medium. A close look at this tropical hardwood is warranted before choosing it for a project. Although its reputation was rightfully built on durability and attractiveness, it has some shortcomings woodworkers will want to consider.

General Description

Teak originally grew wild in Indian and Southeast Asian tropical rain forests. Today it is "farmed" on plantations *in* both the African and South American rain forests. Teak is one of the few tropical species that can be sustainably managed in this way. Make sure your lumberyard knows whether their teak is plantation grown. With teak you will get a wood that is relatively heavy in weight, shrinks very little in drying, is somewhat easily worked and tremendously resistant to rot. It also has a fair amount of inherent strength, though it does become quite brittle when dried. However, it can't measure up to the strength of oaks or maples.

The color of teak ranges from strawlike yellow–brown to a rich chocolate brown. Often, within the same board, many brown colors will swirl together and compete for the attention of your eye. It looks like different chocolate bars melting together. This is one of the attributes that makes teak lumber so desirable. Teak also darkens with age and the unfinished surface will usually have an oily feel to it.

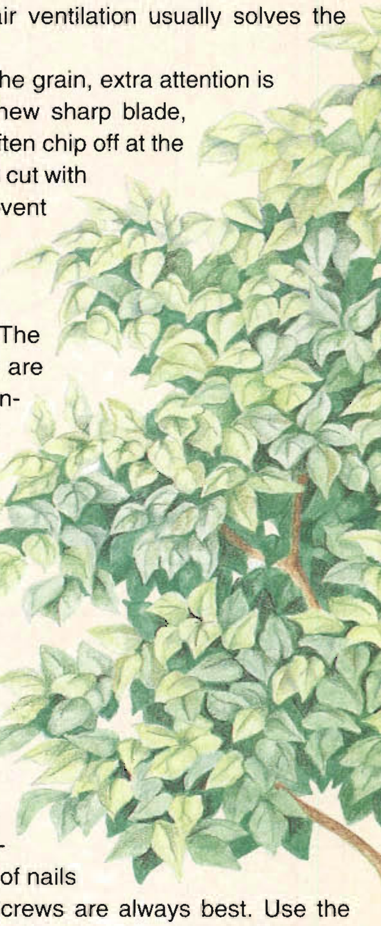
Teak lumber is fairly easy to bend, though it's not as flexible as Philippine mahogany (see PW #63) or white cedar (see *Popular Woodworking* #65). Because of its superior ability to resist rot and its low maintenance, the wood is often used in boat planking and decking, both of which require bending. Its ability to resist extreme volumetric expansion and contraction also makes it popular for exterior uses.

As might be expected, teak is often used in exterior applications where rot resistance is important: boatbuilding, boat accessory items, tight cooperage, lawn furniture, flower boxes and the like. However, it is also commonly used in interior applications, most notably fine furniture, paneling, turned items, kitchenware and so on.

Working Properties

Although its normally straight grain should make teak an easy wood to work with, this is not always the case. Most teak wood contains silica, a mineral that will dull your planer blades more quickly than other comparable hardwoods. When you combine dull blades with teak's coarse texture, planer chipping can develop. To solve this problem, take very little off a plank on each pass, 1/16" or so, or have additional sharp planer blades ready at all times.

As you work with teak, you'll notice its distinctive odor, something akin to old shoe leather. In some planks, this smell can become very pronounced and somewhat unpleasant. Moreover, some people have very strong allergic reactions to teak, even with a dust mask on, and long after the woodworking machinery has been turned off. Open–air ventilation usually solves the problem.



When sawing teak across the grain, extra attention is required. Even if you use a new sharp blade, small bits of this brittle wood often chip off at the cut edge. Scoring the line to be cut with a razor knife will generally prevent this. Remember, the silica in teak will tend to dull your saw blades relatively quickly.

Turning teak is fairly easy. The brittleness and coarse texture are counteracted by the wood's general hardness. This makes it easy to turn a reasonably smooth surface. The wood tends to come off in a dusty manner, not in chips.

Fastening teak is a mixed blessing. The natural oils in the wood prevent chemical reactions that are common between fastenings and many other domestic or tropical hardwoods. These oils also make turning screws into teak very easy. The oils do, however, make the holding power of nails in teak somewhat suspect. Screws are always best. Use the correct size pilot hole and, if using an electric screw gun, keep the torque low. With all that oil making the screw go in so easily, be careful not to crush the wood in the countersink or mar the screw head with too much torque.

Gluing teak may present some unique problems, too. The wood's natural oils can prevent some resin glues from creating an adequate bond. Preparation of the gluing surfaces (such as an acetone rubdown) may help. Generally, the glue manufacturer will have specific instructions on how to deal with teak. Epoxy glues tend to work a little better and without so much fuss. It is a

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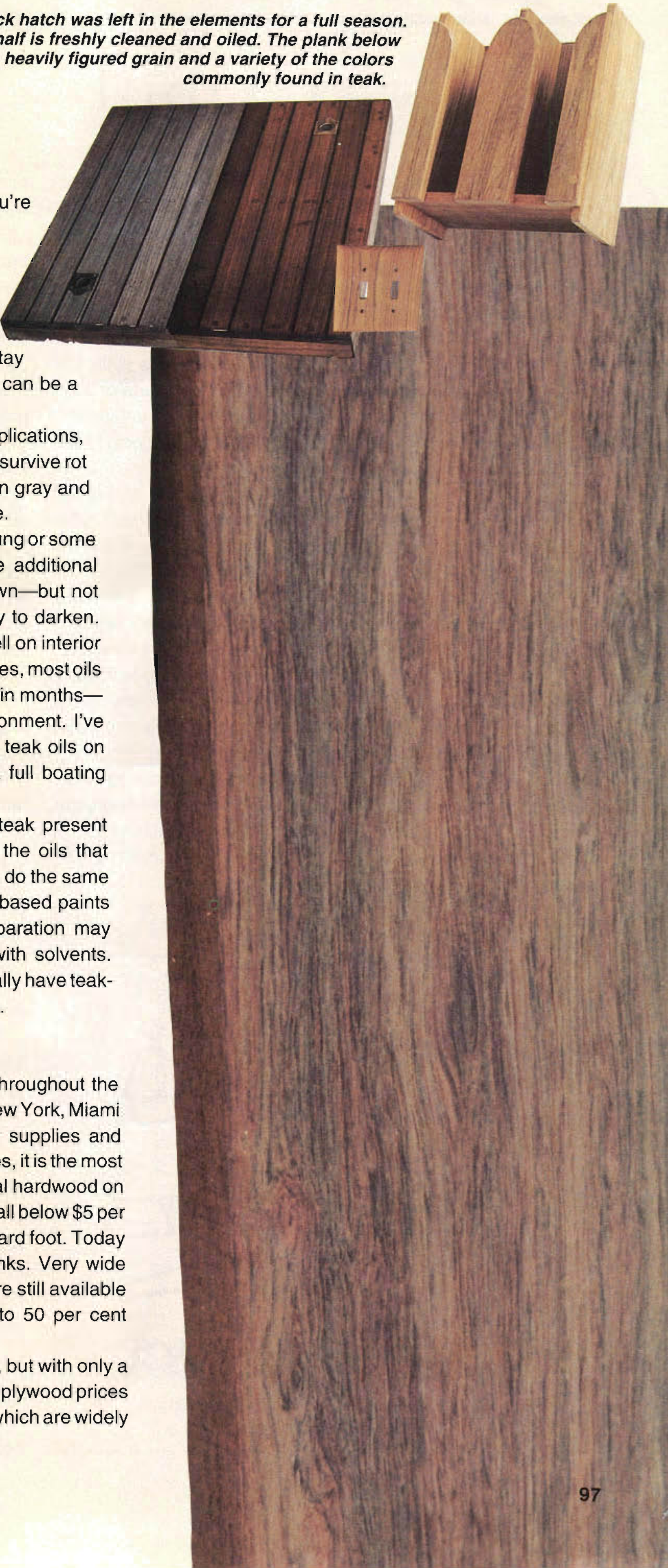
***Ken Textor** works wood and writes about it in Arrowsic, Maine.*

This teak deck hatch was left in the elements for a full season. The right half is freshly cleaned and oiled. The plank below shows a heavily figured grain and a variety of the colors commonly found in teak.

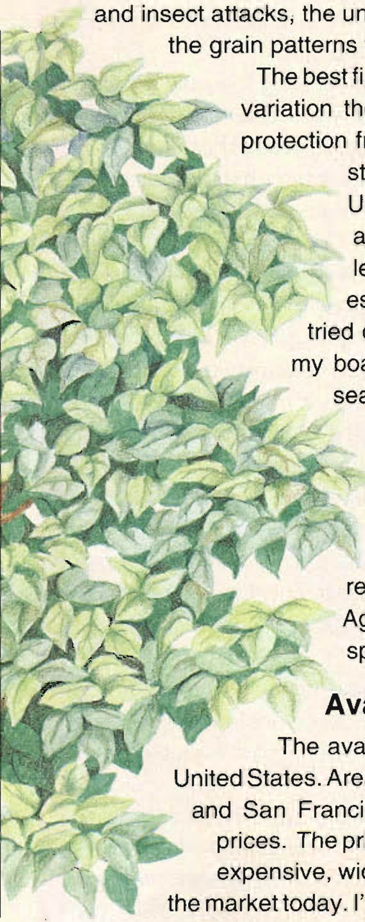


good idea to check with the manufacturer to be sure that you're using the best teak–specific procedure.

Finishing

Teak's natural oils and durability make it a prime candidate for a completely natural finish. In interior applications this approach is fine, unless you have children whose hands stay remarkably dirty. That dirt combined with teak's natural oils can be a constant cleaning problem.

Leaving teak unfinished is not advisable in exterior applications, particularly if you want the grain to stay visible. Although it will survive rot and insect attacks, the unfinished wood surface will turn gray and the grain patterns will become undistinguishable.



The best finish for teak is an oil, usually tung or some variation thereof. This gives the surface additional protection from dirt as well as toning down—but not stopping—the wood's tendency to darken. Unfortunately, oil only works well on interior applications. On exterior surfaces, most oils leach right out of the wood within months—especially in a salt water environment. I've tried dozens of specialized marine teak oils on my boat and none have survived a full boating season.

Paints and varnishes on teak present their own problems. Again, the oils that play havoc with glues tend to do the same thing to both oil– and water–based paints and varnishes. Surface preparation may require an extra step or two with solvents. Again, paint manufacturers usually have teak-specific application instructions.

Availability

The availability of teak is very good throughout the United States. Areas near major port cities like New York, Miami and San Francisco may have slightly better supplies and prices. The price of teak varies. In most cases, it is the most expensive, widely available common tropical hardwood on the market today. I've never seen the retail price fall below $5 per board foot and it has soared to as much as $15 per board foot. Today it is usually between $7 and $10 for one– or two–inch planks. Very wide planks (over 12 inches) and very long planks (over 20 feet) are still available but are becoming increasingly scarce. You will pay a 20 to 50 per cent premium for such lumber.

Teak is available in many plywood sizes and thicknesses, but with only a moderate savings compared to solid lumber. With lumber and plywood prices as high as they are, many woodworkers turn to teak veneers, which are widely available and found in a variety of sizes. PW

Out of the Woodwork

by Jeff Taylor

Peace of Mind

A quick bite of breakfast, a hurried morning greeting to our guest—her mother. Then, as if shot from a cannon, I'm out the door and into my shop. Finally, some uninterrupted project time, in Woodhog Heaven.

When the tidings arrive that my motivator–in–law is about due for the annual visit, there follows a great and frenzied preparation, after the initial rejoicing. The pooches move outdoors, the fatted cat gets a flea bath, yowling as if slain, and my wife splits into seven genies, washing lightbulbs and flossing refrigerator coils. Best of all, the entire house must be rebuilt; I may go unhindered to the lumber store and purchase anything at all. Projects I have put off to the point of abandonment finally get done.

But then she comes, and even the dogs bristle and growl. That's when I feel a compelling need, an ear–deep instinctive yearning, to clean and organize my shop as if I were going to live therein for two weeks.

Here in the peaceful privacy, I can express the most outrageous opinions without fear of contradiction, and here's one: two weeks is overlong for a visit. But it is during these times that I rediscover the handmade dovetail. There is something simple and time–consuming about it—the quiet slide of the pencil, the careful alignment of elements, the smash of the mallet against the wood, and the soft sound of my shop vise cracking walnuts.

Afterwards, it's time to dress the bench, and nothing works better than tung oil on a toothbrush. The bench vise needs grease, too; a good vise should twirl like a bicycle sprocket. Just look at the mung on those threads; better take it apart. The hours flit by. Five minutes inside for lunch, a few peace–conducive words to my wife's mother, and I'm back to it.

***Jeff Taylor** keeps his pen flowing in Blodgett, Oregon.*

"Well, if you ask me, I'd say this is the right tool for the right job."

By this time, Day Number Eight, most of my woodworking projects are already done, the result of seven consecutive all–day marathons. But there are other equally important tasks ahead; by my estimation, six more days worth. For instance, I'm astonished to see how dull my chisels have gotten. You can barely see yourself in each mirrored edge. They all should be reground on a wheel and whetted on an oilstone; to sharpen nine of them properly takes three hours. It's amazing, too, how much dust and guck can accumulate in the average bench brush. Might as well vacuum and comb the glue out, a chore I perform only once a year, but oh so meticulously. It puts me in the mood to clean my other tools before starting another project.

A few minutes after supper, I'm sanding the rasp marks off a walnut toothpick when my wife comes in. She rips my cigarettes off the shelf and lights one with an angry toss of her head. The she discovers that she doesn't smoke, which makes her truly unhappy, but she keeps puffing. I venture: "Hi, honey. How are things going?"

Blowing twin streamers of smoke from her nostrils, she lists, in a strangled whisper, the most recent and vivid outrages—"And then do you know what she said?!" The gist of it warms my heart. Surely there's no finer feeling than hearing your beloved co–partner get mad at someone else. I go "mmmm" and "tsk–tsk" and "well, how do you feel about that?" While silently polishing a beatific inner composure, I keep on sanding.

"She made it sound like I've been shoveling big piles of dirt and gravel and dog hair under the couch for years!"

Strange how the old jewel seems to upset reason until the tension in the house is thick enough to cut slabs of it with a band saw. Even the dogs won't go inside except to eat. You can't argue with a dog's good sense.

"She also mentioned in passing that you spend much too much time puttering around with wood instead of...." I shrug, untroubled. Her mom is entitled to that opinion; in fact, on this visit I intend to prove it.

Actually, I admire the formidable old sweetheart, pushing seventy–something and still playing nine holes of golf every day. We may not agree on politics, art, religion, news, sports, science, weather or the meaning of words, but why should I wear myself out arguing with someone who has a natural gift for it, backed by half a century of constant practice? One must simply make allowances and adjustments for lifestyle disruption, as with any passing plague. What a pity she's allergic to sawdust.

"If I ever want her advice again, I'll choke it out of her!" my wife finally says, running out of steam. "Whew. Two weeks is too long for a—hey, this place is really spotless!"

"Yup. You know what they say cleanliness is next to," I tell her. Peace of mind, that's what. PW

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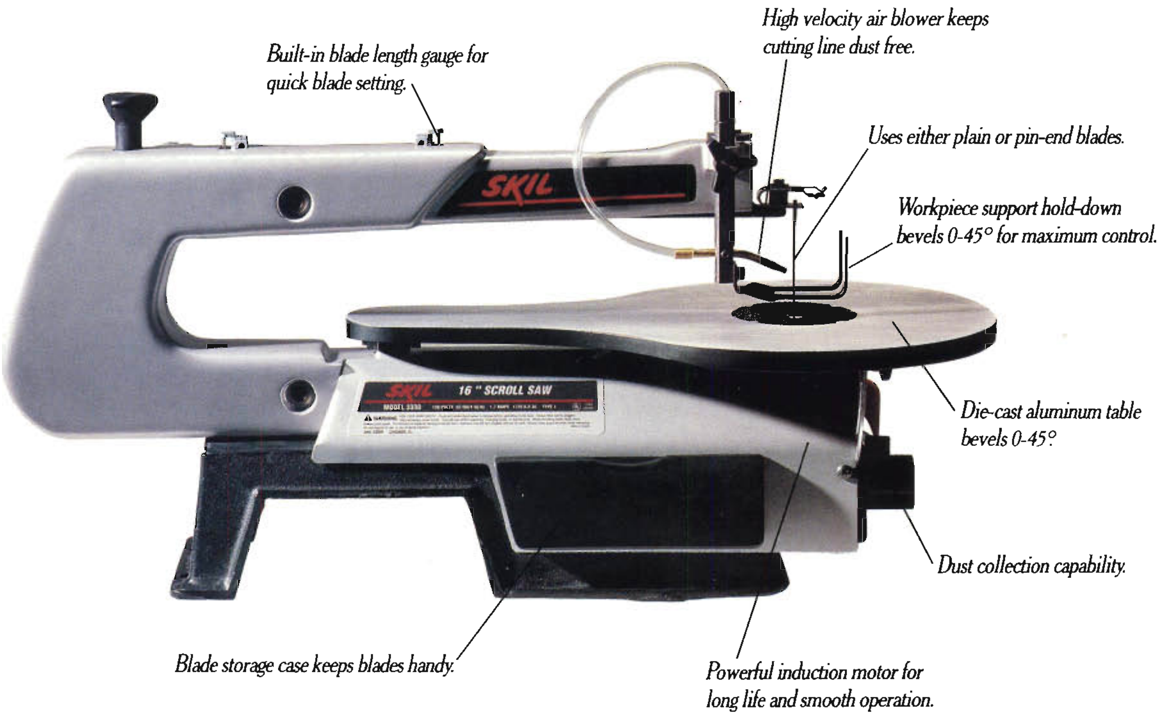
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